Weather sentences

in a cross-linguistic perspective

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Abstract

This dissertation investigates from a typological perspective the syntactic variation of meteorological expressions in non-metaphorical contexts. The cross-linguistic research starts from a 99 language-sample and is based on two general classes of meteorological phenomena: *dynamic*, represented by precipitation and *static*, such as temperature and light conditions. Meteorological expressions are considered zero-valency constructions because no genuine semantic participant can be identified. After analysing the encoding patterns, a new morpho-syntactic classification of these constructions is proposed, according to the type of subject, which can be the weather phenomenon itself, a null subject, an expletive pronoun or an abstract entity. Each of these subject types can allow a certain range of syntactic combinations, and the verbs they combine with can vary both semantically and in terms of valency.

Moreover, this novel classification of weather sentences according to the type of subject allowed me to identify certain geographical and genetic consistencies, as well as some correlations between the linguistic mechanisms employed and the type of weather event. I observed that the encoding variation of weather phenomena has a semantic basis, and I have shown that in the case of precipitation, which is a dynamic kind of weather phenomena, the most common expression is a construction in which the subject is the weather phenomenon itself and a verb of motion, since it is a phenomenon that involves something material that can be perceived as a moving subject, whereas for temperature and light conditions, representing a static kind of weather event, the most recurrent pattern is a null or expletive subject and a meteo verb (the predicate is the one that carries the meaning of the weather event) and the semantic reason lies in the fact that there are no tangible elements that can be perceived as subjects and therefore, it is expected that the sentence is impersonal and there is no subject.

Finally, by crossing the subject type in the two classes of phenomena, I demonstrate that languages usually select different types of subjects for precipitation and temperature and light conditions.

Keywords: weather sentences, zero-valency verbs, meteorological expressions, cross-linguistic investigation, subject

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1. Introduction

Weather is a phenomenon irrefutably linked to human existence, which is often shaped by its whims. Human activity usually depends on climatic conditions or the periodic evolution of the weather, which is many times seen through the prism of how it can affect human life in positive or negative ways. Thus, we might venture to say that almost all languages should have meteorological expressions to describe at least the most common phenomena in the area where those languages are spoken, and some of them employ quite a rich vocabulary when talking about weather, suggesting that the weather has a strong impact, not only on people's lives, but also on language. Moreover, it has been observed that there is a diversity of formulas for expressing these weather events, which inevitably are part of most common conversations. And this is precisely why it constitutes such an intriguing topic, not to mention the impressive diversity of syntactic configurations in which they might appear. Their argument structure represents also a point of interest for linguists, especially since it differs quite considerably cross-linguistically and also in terms of the weather event under discussion.

Thanks to scientific knowledge, people are nowadays able to understand the occurrence of meteorological phenomena, which are no longer a mystery for civilized societies. Nevertheless, some languages still preserve remnants of millenary beliefs and attribute them to divine forces, which is also reflected in the grammatical structure of these expressions.

Perhaps the most intriguing aspect of these expressions is related to the fact that there are no real participants and are canonically known as zero valence verbs, although at a superficial level, it seems that some verbs in weather expressions allow syntactic arguments, which can be either the subject or the object of the verb. Furthermore, the weather phenomena itself can assume the role of an argument, accompanied by a semantically bleached verb, or even a weather verb, but this will be the object of the classification that I will expose in more detail, in the following chapters.

There is not so much cross-linguistic research on weather sentences and this topic of investigation is still a fairly new subject, meaning that there is still room for more detailed insight into how languages conceptualize weather, despite the fact that there are a few reference studies that have shed some light on this issue. In this respect, probably the most relevant research is the one proposed by Eriksen et al. (2010, 2012), which actually is the

framework chosen for the semantic classification of weather events of the present study, even though the aim is to further explore the grammatical structure of these meteorological sentences, by highlighting whether there is any subject and also comment on the element that occupies either the position of the subject or the object, whenever an argument appears, something that was rather neglected in Eriksen et al.´s (2010, 2012) study and I consider to be quite significant, as it could be either the phenomenon itself, an expletive pronoun, or another element, like a deity, sky, day, weather, etc. The authors also found a possible correlation between the event type and encoding formats parameters, which is worth investigating in more depth. This correlation might be the result of certain tendencies of encoding types for some specific weather event types.

The rest of the paper is organized as follows: section 2 will be an overview of the most relevant and influential literature on this topic and will establish a theoretical background for weather, meteorological or ambient sentences and zero valence verbs. There is a paucity of studies that address this issue from a purely typological perspective, most studies being devoted to the debate on the argumentative configuration of these sentences and the dual behaviour of meteorological verbs, which are considered unergative by some and unaccusative by others. But this section will focus on the linguistic variation found by some authors and the typologies they established, following both the points of convergence between them and the discrepant perspectives, with the aim of achieving a typology that reflects as closely as possible the existing linguistic variety. The main papers I will cover in this section are from Eriksen et al. (2012) who focus on the formal and semantic variation; Kienpointner (2016) who develops a conceptual model with two poles with intermediate spaces in between, namely the ¨phenomenon pole¨ and the ¨entity pole¨ and finally, Dong et al. (2020), who attempt to establish a new weather event typology based on meteorological ontologies, especially in Sinitic languages. Section 3 will present the aims and main hypothesis and section 4 will describe the methodology and provide information about the sample and the criteria for selecting and ruling out some of the languages, depending on the type of weather event. In the following section (5) I will test the consistency of the three implications proposed by Dong et al. (2020) in a group of Indo-European languages, through questionnaires filled in by native speakers of these languages. The following section (6) will be devoted to the interpretation and analysis of cross-linguistic data found in a sample of 99 languages, in order to establish a typology of the weather constructions. I will determine the constructions employed by

these languages and classify them in types and subtypes, starting from the semantic typology of the weather phenomena established by Eriksen et al. (2010, 2012), but with a different approach to the formal typology, since I focus mainly on the subject of these expressions (or the lack of it for the avalent constructions, that do not feature an argument), hoping that these findings will somehow complement the existing literature and will provide a new perspective on the configurational possibilities of these constructions. A brief discussion and some concluding remarks will be provided in the last section (7) of this paper.

2. A theoretical background on weather sentences

This section will be devoted to three different typological approaches on weather sentences. These three proposals attempt to classify cross-linguistically either the meteorological constructions or the weather events (formal and semantic typologies). In fact, all three have quite a lot in common and perhaps differ only in relation to the terminology chosen or in issues of nuance, but it is worth mentioning them as they pave the way for the next sections.

2.1 Cross-linguistic formal and semantic variation (Eriksen et al. 2012)

I will proceed with what is probably the most cited typological work related to weather sentences, that of Eriksen et al. (2012) which aims to develop a typology of both weather events and encoding formats of weather expressions across languages. It also identifies some distribution tendencies of certain encoding types according to the type of weather event. This typology, unlike others, is not limited to a single language family or a certain geographical area, rather it tries to cover as many languages as possible in order to establish a more accurate, although not exhaustive, description of the linguistic diversity of these expressions.

As for the encoding patterns, i.e. the formal typology of meteorological constructions, this is based on the element which the meteorological expression is built upon, namely the element which, from a semantic point of view, carries the meaning of the meteorological event. Apart from that, it covers quite a large number of meteorological phenomena, not only the prototypical or more common ones, such as *rain*, and from a

grammatical perspective, it takes into account other parameters, such as *valency* and *parts-of-speech.*

However, no matter how advanced these authors' typological approach may be, the data obtained are not sufficient to establish a geographical distribution of the patterns found, as a much larger sample of languages would be needed. Although the number of languages is not specified, the authors state that their paper is based on a relatively small language sample, and the examples were collected mainly from informants, making the sample quite biased. Therefore, I believe that contributions such as this one are particularly necessary to complete the cross-linguistic overall picture of meteorological expressions with data from a more extensive sample. So, this thesis will try to fill a gap in the typological investigation of weather expressions, by analysing even more languages and observe whether there are any geographical and probably also some genetic tendencies.

The question from which their investigation starts is why, if meteorological expressions do not involve real participants, the languages of the world display such a complex formal variation. Eriksen et al. (2012) believe that they all derive from avalent predicates and that they lack ¨genuine semantic participants¨ (ibid. 385), although not everyone shares this view[1].

I. The typology of encoding formats

Regarding the construction mechanisms employed for these expressions, the main criterion for their classification is according to the element responsible for encoding the meteorological event and a three-fold typology is implemented, whereby meteorological expressions are divided into three categories: *predicate type, argument type* and *argument-predicate type* (idem). Moreover, in the case of each of these categories, the valency can also vary (deriving into atransitive, intransitive, transitive, expletive, existential structures), as well as the part of speech involved (verbal, adjectival, adverbial,

[1] Bleutu (2012) and Kienpointer (2016) claim that weather verbs do have real semantic arguments, bearing theta roles, whereas authors like Álvarez-López (2021) believe that the syntactic evidence does not support the idea that weather *it* or the DP from the weather construction can be considered arguments, and claims that the syntactic variability of meteorological constructions and the presence of a DP or a pronoun that seem to behave like arguments, are the result of a combination of intrinsic constraints of the language, such as the EPP constraint. Also the features of functional elements such as the expletive, which could be either overt or covert pronoun contribute to this variability.

nominal). Furthermore, there are languages that feature multiple patterns depending on the type of event, or even the same phenomenon is expressed in different ways.

1) The ***Predicate type***, as the name suggests, is the one in which the predicate carries the meaning of the meteorological phenomenon. A nominal argument may also appear, but it will not have a full meaning, but rather a purely grammatical role. Also, as in the case of the other types, valency can vary, and there can be predicates that do not require any other obligatory element, classified as the ***atransitive type*** (1), or the so-called *zero-valency predicates*. They are the only element needed to convey the meaning of the meteorological phenomenon and are considered prototypical weather constructions.[2]

Romanian (personal knowledge)

(1) Plouă.

rain-3SG.

´It rains.´

Apart from atransitive predicates, we can also find ***expletive*** (2) or ***intransitive types*** (3)[3], where the presence of an argument is mandatory. In the case of the former, a dummy subject, that is, a neutral or non-referential pronoun or even a spatial adverb usually appears, playing the role of the grammatical subject. On the other hand, in the *intransitive predicate type*, the argument appearing in the subject position is referential and not semantically vacuous, and it usually describes the background entities that are related to the meteorological phenomenon and can be: *locational* (the world), *temporal* (the day) or *atmospheric* (the sky). On the other hand, some languages allow divine subjects, which reflects the religious view of weather phenomena and the perception of deities as their causes.

English (personal knowledge)

(2) It is hailing.

[2] In this section I will not quote the examples offered by the authors, but provide examples from my own language sample instead.

[3] It is not clear whether these verbs are unergatives or unaccusatives. The former denote volitional acts performed by an agent who controls the event. They lack an internal argument, but in certain configurations can assign the accusative case. On the other hand, unaccusatives denote non-volitional acts, where the argument is not the Agent. They cannot assign accusative case and lack the external argument. The fundamental difference between these two types of verbs resides in the status of the subject: whether it has the quality of agent or not. Bleutu (2012) proposes two possible configurations, each corresponding either to their unergative or unaccusative behaviour. As unergatives, the structure is CAUSE [FALL RAIN] and in the case of unaccusatives, FALL RAIN. This dual behaviour of the weather verbs implies that their grammatical subject can sometimes be Theme and sometimes Agent.

Paiwan (Chang, 2006: 196)

(3) udjal=anga a kareverevan.

rain<AV>=COM NOM sky

´The sky (has started to) rain. ´

In the *predicate type* class, we also find the ***transitive predicate type*** (4), although very rarely, where the weather verb has two arguments (a subject and an object). This type is not the primary one in any language, but rather plays a secondary role, probably to emphasize a certain property of that weather phenomenon.

Finnish (Eriksen et al., 2012: 388)[4]

(4) Cumulonimbus sato-i puolisenttis-i-ä rake-i-ta.

Cumulonimbus rain-PST.3SG half.a.centimetre-PL-PART hail-PL-PART

'The cumulonimbus-cloud rained half-centimetre thick hailstones.'

2) As for the ***Argument type,*** here the element denoting the meteorological phenomenon in question is not the predicate, but the noun. Its valency can also vary, like in the *predicate type* and the most common one is the ***intransitive argument type*** *(5),* where the predicate has a more vague semantic content and usually it is not only specialized for meteorological expressions, but also occur in other contexts (e.g.: 'go', 'flow', 'fly', 'return', 'fall', ´happen´, ´walk´, etc.). Also, they claim that the argument that denotes the weather phenomenon can be regarded either as a subject or an object[5]. Another subtype of the argument type is the ***existential*** (6-7), consisting of an argument referring to the phenomenon and a copulative verb.

Mongolian (Janhunen, 2012: 226)

(5) en´ eubel tzas yix or-aosai

[4] For the transitive types, I will quote the examples provided by the authors, as it is not clear why Eriksen et al. created this separate subtype of the predicate type, instead of simply including these constructions in the argument-predicate type, where the argument could be either the subject (intransitive type) or the object (with a transitive verb and a null subject). The reason might be the fact that both arguments must be overt, although I do not consider that this should be a requirement for a verb to be classified as transitive, especially when there is an overt direct object. The problem can be also that this object might be mistaken for a subject and the construction could be typed as intransitive. When the authors present the argument-predicate type, they provide the example of Greek, where the argument of a weather predicate is regarded as a direct object.

[5] In section 6, within the classification I will establish, the constructions where the only argument is regarded as an object will be classified as transitive, and when the argument is regarded as a subject, I will consider them intransitive and I will rely on the argument structure of the verb.

this winter snow big enter-DES

´I hope it will snow a lot this winter!´

Berber (Mourigh, 2015: 446)

(6) g lehwa nya i-ttill lehwa nya i-ttil tiṣmet

in rain when 3M.SG-be:I rain when 3M.SG-be:I cold

´When it rains and when it is cold´

Italian (Bleutu, 2012: 4)

(7) Oggi c'è il sole.

today there.is the sun.

'It is sunny today.'

As in the case of the predicate type, the ***transitive argument type*** (8) is also very rare, and it has been attested in very few languages, but the authors consider that it is worth mentioning. The authors also point out that in these constructions there must be two participants: an agent and a patient and they do not consider as prototypical transitive sentences the "V + NP" structures (9), where the subject is omitted, or "Pron. + V + NP" (10), with an expletive pronoun, like the ones from Spanish and French, which according to their vision would be typed as argument-predicate type.

Northern Akhvakh (Denis Creissels, p.c. apud Eriksen et al: 390)

(8) Miƛi-de gõʁwel-āʎri duna.

sun-ERG illuminate-PERF world

'The sun is shining.' (Lit. 'The sun has illuminated the world.')

Spanish (López, 2021: 2)

(9) Llovía una lluvia muy fina.

rain.IPFV.3SG a rain very fine

'It was raining a very light rain.'

French (López, 2021: 3)

(10) Il a plu une pluie froide toute la journée.

EXPL rained.3SG a rain cold all the day

'It rained a cold rain all day.'

3) Lastly, we have the ***argument-predicate*** (11) type, where as expected, both predicate and argument denote the same meteorological phenomenon, and this structure resembles other cognate object constructions, such as *dream a dream* (ibid. 390).

Udmurt (Salo, 2011: 426)
(11) *tẹ̈l tẹ̈la* 'the wind is blowing'

II. The typology of weather events

After presenting the encoding formats typology, the authors also come up with a typology of meteorological events, something that, in their view, was missing until then. The main goal is to correlate the two typologies (the formal and the semantic ones) and see how the encoding types are distributed according to the type of weather event. This typology is mainly based on semantic differences and weather phenomena are divided into *dynamic* and *static* depending on the event´s degree of perceptibility. In the case of rain, thunderstorms, wind, the action and dynamism are more obvious, as opposed to static events such as atmosphere, temperature, humidity or brightness conditions. Furthermore, dynamic events can be classified into ***precipitation*** (rain, snow, hail, sleet) and ***non-precipitation*** (thunder, lightning, wind), and static events can be either ***atmospheric conditions***, including ***temperature, humidity*** and ***daylight***, or in a separate category the ***sunshine***, or the light emitted by a celestial body.

As for 1) **precipitation**, it seems to be one of the most salient meteorological phenomena and this accounts for the fact that it can be encoded by any of the three types mentioned above. In addition, languages generally opt for a single encoding type for all kinds of precipitation (rain, snow, hail, sleet), and in the case of *argument type*, they often select the same supporting verb. It also seems that this support verb is specialized for precipitation, while other verbs are used for the rest of the phenomena. *Predicate type* is quite widespread in Germanic, Romance, Sami and some North American Indian languages, and *argument-predicate type* is found especially in Northern Vanuatu languages and languages such as Lithuanian (ibid. 393). In the case of 2) **non-precipitation**, the diversity of patterns encountered is much greater than in the case of precipitation, and non-dynamic events, such as 3) **temperature conditions and light conditions**, are usually expressed by the predicate type. Finally, in the case of 4) **sunshine**, languages more commonly resort either to the *argument* or *argument-predicate*

type and this seems to be due to the fact that the meteorological event has a fairly obvious participant, namely the sun, but other light emission phenomena are also encoded in the same way.

It is quite clear that there is an impressive diversity of encoding formats for weather events and it seems that this is also a consequence of some semantic differences, with certain tendencies to opt for a specific encoding type depending on the kind of phenomenon, but the paper by Eriksen et al. al (2012) is based on a rather small number of languages, which makes any statement about the frequency and geographical distribution of each encoding type risky, and in addition, many languages use several patterns to designate different phenomena or even the same phenomenon.

2.2 The *meteo-scale*: a continuum with two poles (Kienpointner, 2016)

Another interesting typological remarks can be found in Kienpointner's (2016) paper, an article that focuses mainly on weather verbs in German and Latin, which I will not discuss here. Instead, I will refer to the ¨*meteo-scale*¨ that the author proposes, which actually represents a conceptual model with two poles: the ¨*phenomenon pole*¨ and the ¨*entity pole*¨, where, needless to say, there can be weather sentences patterns located in the intermediate spaces between the two poles (ibid. 6). In fact, the model represented is a kind of continuum, and weather sentences can occupy a place either in the two extremes, or an intermediate space that can be closer or further away from the two poles. The phenomenon pole is composed of instances where the weather phenomenon is represented by a verb only, which would correspond to the predicate type, in Eriksen et al.'s (2012) view, but the author notes that the phenomenon is perceived here as a pure process, without revealing the presence of any entity. From a grammatical point of view, the purely phenomenon pole (12) translates into an atransitive construction, where no argument is expressed. This type of structure is very common cross-linguistically (Malchukov and Ogawa, 2011: 25 apud Kienpointer, 2016: 7) and is representative for the impersonal expressions without a subject. At the opposite end we have the ¨entity pole¨ (13), where the weather phenomenon, perceived not as a process, but as an entity or force, is depicted by a noun, which can often appear together with a supporting verb, which is also used in other contexts, as they are not ¨meteo-specific¨ (ibid. 7).

Stoney (Cumberland, 2005: 209)

(12) a. mağážu ´it is raining´

b. wáhihạ́ ´it is snowing´ (hịhạ́ ´to fall, precipitate, as rain or snow´)

Persian (Mahootian & Gebhardt,1997: 211)

(13) mi-g-ænd færda barun mi-ya-d
DUR-say-3 tomorrow rain DUR-come-3SG
´They say it's going to rain tomorrow. ´

On the other hand, a variety of other formulas may exist in the intermediate zone, where both the entity and the process may be highlighted. The most clear-cut area in between can be considered the *cognate type* (14-15) (idem), a construction that consists of a noun and a verb that are etymologically related and designate the same weather event, that is, they have the same conceptual content.

Ts' ixa **(**Fehn, 2016: 153)

(14) túú=m̀ tuù-tɜ̃ sáó ʔà
rain=SG.M rain-IPFV.NEG winter LOC
´It does not rain in winter. ´

Mari (Salo, 2011: 426)

(15) a. lum lumeš 'it's snowing'
b. jür jüreš ´it´s raining´

On the other hand, expressions with a neuter pronoun and a verb (which would correspond to the *expletive type* in Eriksen et al. 2012) also cover an intermediate area of the continuum, as they express both the phenomenon and an entity involved in the weather phenomenon, although not in an explicit way and obviously, it would be closer to the *phenomenon pole* than the *entity pole*.

From a semantic perspective, it seems that some meteorological phenomena are more likely to be located at the *phenomenon pole* because it is difficult to identify or delimit the entities involved, and examples include: *darkness*, *dusk*, *dawn*. By contrast, in the case of rain, both the process (the falling of the water) and the entity involved (the rain itself, the emitted substance) are visible and therefore, allow expressions within the phenomenon and entity area, or even the cognate type. Also, when the participant of a weather event is salient, languages usually opt for a pattern located at the entity pole, and this is mainly the case for sunshine (or even other celestial bodies like the moon, although it would not fit into a prototypical weather expression), which involves a delimited entity,

i.e. the sun. Therefore, it is reasonable to expect that the pattern where sunshine is expressed by an atransitive verb is very rare.

Kienpointner points out that his perspective differs from other similar typological approaches (such as Ruwet´s, 1986 apud Kienpointner, 2016: 8) that view meteorological expressions on a continuum with two extremes, in the sense that the former treats the constructions with atransitive predicates and expressions containing expletive pronouns as belonging to different zones of this continuum. In contrast, Ruwet relies on the near-synonymous truth conditions of the two, claiming that they are semantically identical, but Kienpointner disagrees and argues that from a purely linguistic perspective, they are part of different zones of the *meteo-scale*.

If I were to comment on a weakness of this *meteo-scale* typology, it would be that it does not demonstrate how it could apply to a wider variety of weather phenomena, but also where on this scale, the expressions that, besides a weather verb, include also a nominal subject (such as those reported by other authors mentioned above: *sky, day, God, weather, etc*) would belong, given that they would not swing the balance in the favour of any of the two poles, but would also differ from sentences with an expletive pronoun, which is semantically weaker and does not add any conceptual content to the sentence. It would be interesting to find out where the author would place them, given that they can be perceived on one hand as a process, since the meteorological phenomenon is expressed through a verb, but there is also an abstract entity (the grammatical subject) that does not belong to the denotation of the phenomenon, but does participate in the event.

Moreover, this scale is very intuitive, which makes it rather unpractical for classifying languages and comparing them in order to observe areal effects, since it would be necessary to delimit concrete points on the continuum that correspond to each individual structure, which would contradict somehow the author's idea of placing these expressions on a continuum.

2.3 A third typological proposal on weather events (Dong et al 2020)

In the last part of this section, I will comment on an even more recent proposal that tackles meteorological expressions. This is what is supposed to be a new typology of weather events formulated by Dong et al. (2020) and which does not necessarily target the

encoding formats, but comes as a response to the delimitation of semantic variation developed by Eriksen et al. (2012) based on synchronic and diachronic data from Sinitic languages in particular. What is quite remarkable about this paper is that it includes some of the most overlooked meteorological phenomena in the typological studies, namely *fog*, *dew* and *frost*, which seem to correlate with precipitation in terms of their encoding types, but also in terms of their downward directionality.

Besides the formal typology that observes the grammatical categories responsible for encoding weather sentences, the meteorological taxonomy that aims to relate different weather phenomena to a certain type of encoding is of particular interest to some linguists because it can give clues about how language relates to the ontological realm of the weather. This is why a typology of meteorological expressions needs to include as many phenomena as possible and this paper's authors insist that a reconfiguration of the classifications proposed in previous studies is necessary, since the three phenomena mentioned above not only have a rather puzzling grammatical behaviour, but also have quite considerable implications for the structure of this typology. In particular, because there are three types of atmospheric water, where we distinguish *precipitation* for rain, *condensation* for dew and *suspension* for fog (Dong et al., 2020: 2) (I would add also *freezing* for frost), but not all of them are dynamic events, like precipitation is and also have in common with rain the presence of a tangible substance (water in different physical states). Also, there are encoding differences between the three in terms of directionality and the parts of speech involved, at least in Sinitic languages.

The Sinitic language family can provide significant data in the typological research because weather expressions can also be studied from a diachronic perspective, since it holds more than 1000 documented languages and dialects and it seems that writings containing weather sentences dated back over 3000 years have been preserved (ibid. 3). Moreover, these languages are spoken over vast territories where there are numerous climate types, which makes the existing data likely to cover almost all weather phenomena.

Dong et al. (2020) contradict two assumptions made by Eriksen et al. (2012), namely that providing a language opts for a particular encoding type to designate rain, it will select the same type for the rest of the precipitation, and argue that Old Chinese employs all the encoding types for different sorts of precipitation. The other hypothesis was related to the

diachronic evolution of the encoding formats for precipitation which started from argument type to generalised predicate type or argument-predicate type and finally to predicate type, which would represent the most elaborated format, as opposed to the first one which is somehow the most trivial. In many Sinitic languages, such as modern Chinese quite the opposite happens: a predicate type evolves into an argument type. It also criticizes the validity of the weather event typology, which in the authors' view is not ontologically transparent or even semantically based, but rather according to how it relates to a certain type of encoding, even if some of the phenomena do not show consistent encoding patterns (ibid: 5). Therefore, based on a framework developed by Ren (2018 apud Dong et al, 2020: 5) the typological proposal meant to provide a better description of how languages encode weather, would be built on two binary features: [±Process] and [±Material], depending on the saliency of the process itself or the presence of a tangible weather product. For example, in the case of rain and wind we would have [+Process], but for the latter we would have [-Material]; coldness would be [-Process] and [-Material] and so on.

I now return to *fog*, *dew* and *frost*, which Dong et al. (2020) report as moving downwards in the Sinitic languages, and which are thought to be related to the argument type. However, other languages, such as Dutch and Spanish express these phenomena through predicate type and do not convey downward directionality (Meulleman and Paykin, 2016 apud Dong et al. 2020: 6). Thus, the authors conducted a cross-linguistic research on these weather phenomena (along with precipitation) to see if there is a correlation between directionality and encoding types and between these particular weather phenomena and three sorts of precipitation. The languages considered were: Nuosu (China), Thai (Thailand), Malay (Malaysia), English (America), Spanish (America), Japanese (Japan) and Korean (China).

And they found that fog, dew and frost are generally expressed by argument encoding and more than half of the languages express downward directionality in at least one of the three phenomena. After analysing the data, they formulated three implications with respect to encoding types and directionality, but which cannot be extrapolated to all the languages because the sample is very small.

(A) The **first** implication suggests that if fog, dew and frost are encoded with argument type, that is, a structure where the phenomenon is expressed by a noun that could be either

the subject or the object, precipitation (rain, snow, hail) will have the same behaviour and this is because precipitation events are [+Process, +Material], which potentially leads to both encoding types (argument and predicate), but whenever the predicate type is adopted, it is because weather products are less salient than the process itself. However, the weather products of fog, dew or frost are less salient than precipitation´s products and this means that they are even less likely to be conceptualized into an argument type. In a nutshell, fog, dew and frost will only be of argument type if precipitation is encoded with argument type as well.

(B) The **second** implication is that when *fog*, *dew* or *frost* expressions explicitly indicate downward directionality (with the help of verbs of motion such as *fall, go/come down*), precipitation will do so as well, because in people´s cognition, these three phenomena fall into the same category as the rest of precipitation forms.

(C) And finally, the **third** implication is that if a weather event expression conveys downward movement, it will be expressed by the argument type. From my point of view, this implication could seem rather obvious, because in the case of predicate type, the denotation of the weather verb already includes downward movement (water falling from the atmosphere), but it remains implicit and adding another element that conveys this downward directionality would be at least redundant, although not impossible from a typological point of view. But this element should be necessarily a predicate or an adverb, because a noun representing a weather phenomenon could not express it explicitly. Thus, the argument type would be the only configuration that could allow the insertion of such a predicate. In a predicate-type configuration there would be no room for another verb that expresses downward directionality.

3. Aims and main hypothesis

After having explored the theoretical dimension of the meteorological constructions and the most salient works on weather sentences, this thesis will try to partially fill some gaps I have detected in previous accounts. The most important gap to be filled is the small representativeness of the samples used in the studies on weather sentences. Instead, I will use a larger sample which allows me to propose a relevant classification and observe some geographical and to a less extent genetic correlations.

3.1 Aims

There are various ways in which languages conceptualize meteorological phenomena and the present dissertation´s first goal is to analyse, from a cross-linguistic perspective, some of the existent weather constructions and to examine if there are certain tendencies or linguistic patterns depending on the type of event. I will provide a morpho-syntactic classification of the possible ways of expressing weather sentences across languages, and the semantic framework for this formal typology will be Eriksen et al.´s (2012) weather event typology. A related goal is to describe the areal distribution of the structures found and to detect geographical and genetic tendencies by observing the most and least frequent constructions and if there are any recurrent patterns within a certain geographical area or language family.

The second goal is to reveal whether the previous typologies and hypotheses are valid when applied to a larger or different sample of languages. This is precisely why I will begin with a small experiment meant to test whether the three implications that Dong et al. (2020) propose can be sustained even in a small sample of languages.

3.2. Main hypothesis

The main hypothesis of the study is based on the idea that there is a semantic correlation between the type of weather phenomenon and the encoding format. Even if the main division is based on the degree of perceptibility of the event, or rather, the degree of dynamism of the phenomenon, another crucial distinction between the various meteorological phenomena is the presence or absence of a material substance or weather product that can be conceptualized as a grammatical subject or object. In the case of precipitation, as a dynamic event where there is a tangible material element, it is expected that languages will select an encoding format where the weather phenomenon itself occupies the subject (or rarely object) position, whereas in the case of temperature and light conditions, the absence of a material weather product will lead to an encoding with a predicate, meaning that the weather phenomenon will not be conceptualised as a noun.

Furthermore, I will investigate this semantic relationship in a new type of classification based on the type of subject and subsequently on the type of predicate, which allows assigning to each language the corresponding pattern in a clear way. It will also allow the

uniform delimitation of subtypes, that are not only plausible, but also have been detected in a larger sample of languages. This sample is not restricted to a single language family, as in Dong et al.´s work (2020), which is based only on data from Sinitic languages, or Eriksen et al. (2012), who although do not mention the number of languages, admit that the sample is too small to draw conclusions about the areal distribution of each pattern. Besides, this new classification will allow me to compare the different semantic types of phenomena with each other, in order to have a clear picture of the differences and determine whether the hypothesis is confirmed.

4. Methodology and methodological issues

4.1. Defining the language sample

Meteorological sentences pose challenges for those who attempt to investigate them from a typological point of view, especially since most written grammars do not devote a separate section to weather expressions and most of the data is obtained based on the interpretation of the examples found. Initially, the language sample was 100 languages and my goal was to be able to establish a typology that would cover most of the weather events that Eriksen et al. (2012) identified in their weather event typology, but at the end it was necessary to reduce their number to 99 languages for *Precipitation* and 85 for *Temperature and Light conditions* because the grammars lacked sufficient examples to cover all those meteorological phenomena. The database used to develop this typology was built on the *100-language Sample* from *The World Atlas of Language Structures Online* (WALS), although 29 of the initial 100 languages proposed in the sample had to be replaced with others belonging to the same macro area and language family[6], except very few cases. On many occasions I attempted to substitute them with languages that belonged to the same genus, except for those situations when no other language in the same genus met the relevant criteria, in which case I had to find a language from outside that genus.

The criteria for discarding a language were the following: when the grammars did not provide at least 3 examples of weather sentences in non-metaphorical contexts, describing at least two of the types of weather phenomena (*precipitation*, *non-precipitation*,

[6] I will provide the full list of languages and their substitutions in the Appendix section.

atmospheric conditions, *sunshine*); if the examples found did not provide glosses or if they were not clear enough to reveal the grammatical structure of the weather construction. However, if the grammar did not provide glosses, but the structure of the sentence could be identified from the translation, the language was kept. Data were collected from grammars that met these requirements, even though most of them did not have sections devoted to weather sentences/expressions, but I looked for the most relevant examples in order to illustrate the cross-linguistic variation of these constructions.

However, after reviewing the materials, I had to rule out many examples of weather sentences due to their potential interpretation as having metaphorical connotations or to the fact that it was not obvious enough that those were the canonical uses of weather sentences in that language. Finally, 93 of the languages meet the previously mentioned requirements, but the proportion in which the four categories were represented was not uniform, with the following overview: *Precipitation* (Rain/Snow/Hail) is represented in 99 out of 100 languages, *Non-precipitation* (Thunder/Lightning/wind) in 67 out of 100, *Temperature/Atmosphere and light conditions* (Cold, Hot, Daylight, Darkness) in 85 out of 100, and finally *Sunshine* in 48 out of 100 languages. Of course, the distribution of each individual phenomenon within its category varies even more, but I will not report it here and I will rely on the validity of the semantically based typology of the weather phenomena from Eriksen et al. (2012), who consider that languages tend to select a certain type of encoding for these two categories of meteorological event, which would be due to obvious semantic differences between them. In view of these data, I decided to consider only one of the two types of *dynamic events*, namely *Precipitation* and *static events*: *Temperature and light conditions* and to discard the other two classes of phenomena (*Non-precipitation* and *Sunshine)* as they are represented in quite few languages.

In addition to the previously mentioned categories of weather phenomena, examples of weather sentences containing phenomena such as *fog*, *dew* and *frost* have been found, although these are far too rare to be taken into account. Also, the semantic differences between phenomena expressing light conditions (*daylight* in particular) and sunshine are sometimes very subtle, and depending on the translation from the grammar, an example could be classified as belonging to one category or another, so only structures where the difference between them was more obvious were considered. When I discuss the encoding types for each weather phenomenon I will refer to the sample for the category it belongs to (99 for *Precipitation* and 85 for *Temperature and light conditions*).

4.2. Defining the features, types and subtypes

For this classification, I will not focus on the element which is foregrounded and carries the semantic meaning of the weather event, that could be either the predicate, the argument or even both of them, as Eriksen et al. (2010, 2012) do, but rather I will provide a morpho-syntactic classification according to the type of subject, and then describe the combinations patterns with that particular type of subject that I found.

In this way, it will be more clear in which syntactic configuration a certain type of subject can occur in a weather sentence. I will classify the type of verb that comes with this subject according to its valence for both Precipitation and Temperature and light conditions, but specify when it is a verb of motion only for the former. Also, I will create a subtype for those cases when a direct object, which is also responsible for encoding precipitation, occurs. For some subtypes, I will mention other possible variations identified in specific languages, but which are not the subject of a new subtype due to the lack of more supporting evidence.

General semantic division of the weather event:	**First division: Syntactic types according to type of subject:**	**Second subdivision: Syntactic subtypes according to the type of predicate**
Feature 1. *Precipitation* (dynamic)	Type 1. Meteo Subject	Subtype 1. Verb of motion Subtype 2. Meteo verb (different root) Subtype 3. Meteo verb (same root) Subtype 4. Intransitive verb Subtype 5. Existential sentence
	Type 2. Null Subject	Subtype 1. Atransitive meteo verb Subtype 2. Transitive verb + meteo object
	Type 3. Expletive Subject	Subtype 1. Meteo verb Subtype 2. Transitive verb + meteo object
	Type 4. Abstract Subject	Subtype 1. Meteo verb
Feature 2. *Temperature and light conditions* (static)	Type 1. Meteo Subject	Subtype 1. Intransitive verb Subtype 2. Existential sentence
	Type 2. Null Subject	Subtype 1. Atransitive meteo verb Subtype 2. Meteo non-verbal predication Subtype 3. Transitive verb + meteo object
	Type 3. Expletive Subject	Subtype 1. Meteo non-verbal predication Subtype 2. Meteo verb Subtype 3. Transitive verb + meteo object
	Type 4. Abstract Subject	Subtype 1. Meteo non-verbal predication Subtype 2. Meteo verb Subtype 3. Transitive verb + meteo object

Table 1. The outline of the formal classification hierarchy.

This classification could have been reversed between the type and the subtype, and a first subdivision could have been made according to the type of predicate and then according to the type of subject, but this would result in too many types and too few subtypes and it seems more logical and methodologically reasonable to first make a classification with fewer elements (types of subject) and then subdivide each type into various subtypes, given that there are more elements it can combine with (types of predicate).

This classification differs from the previous ones which do not seem practical enough for classifying meteorological structures. As far as the *meteo scale* is concerned (Kienpointner, 2016), it is necessary to delimit precise points on the continuum in order to classify languages, which would to some extent contradict his hypothesis that meteorological constructions are not discrete units, but rather part of a continuum with two poles and many intermediate points. Eriksen et al.´s (2012) classification has feature crossings that cannot be efficiently collected when classifying languages and certain implications issues might occur since the starting point of the semantic classification is the meteorological event's dynamism, not the presence of a material element that can be conceptualized into a grammatical subject or object. And finally, the classification of Dong et al. (2020) is too abstract and does not define how [±Process] and [±Material] parameters are reflected in concrete syntactic structures beyond the conceptualization of the phenomenon as an argument or predicate.

On the other hand, another problem is that these classifications are based on rather small language samples, and when a larger sample is analysed, other structures and combinations of arguments and predicates may appear. I believe that this new proposal has the advantage of allowing to assign types and then subtypes to each language in a uniform way and it enables to compare different semantic types with each other.

In order to display the geographical distribution of each weather expression type and subtype, some spreadsheets were created in Excel and fed into ArcGis program in order to create maps for the two categories of weather events, for the four weather construction types, and for each subtype. Moreover, a cross features map for the two classes of phenomena was created.

4.3 The issue of multiple coding

I also faced some methodological issues, in particular because some languages have multiple coding for meteorological expressions and the problem of how to classify these languages arose. Apart from multiple coding within a specific language, there were also cases where within one of the two categories (Precipitation or Temperature and light conditions) the language had different encoding patterns, although not as many as in the case of the same phenomenon. I will opt for one of the classification criteria proposed by Whaley (2012: 18-19), namely, defining a dominant strategy, which is usually the most frequent and the one that imposes the fewest pragmatic restrictions, so it can be used in several contexts and can probably designate the most meteorological phenomena in that category. In addition to this method of typing a language, one could also consider creating a separate category for those languages that have multiple coding. It is also possible to create different categories depending on the combinations of strategies of that language, or to classify a language as being of a certain type only if it exclusively uses a certain strategy. However, for this paper, I believe that these criteria would generate either too many categories or too few. Of course, one can take into account the frequency parameter and choose the most common strategy, but the consequence would be the same: the most common strategies would predominate and one might not represent those types that occur only in certain language families. Therefore, I believe that the most appropriate criterion will be the dominant strategy for that category.

5. Testing previous proposals on weather sentences

After having presented the aims, hypothesis and methodology, I will now test the consistency of the three implications proposed by Dong et al. (2020) in a group of 8 European languages and starting from the third implication, I will make some remarks on the diachronic development of some weather verbs and propose directions for future research.

5.1 The examination of the three implications

As I specified in Section 3, a secondary goal of this work is to evaluate previous accounts on weather sentences from a typological point of view. Most of the implications put forward by Eriksen et al. (2012) were rejected by later authors, more specifically, by Dong

et al. (2020), so I was interested to check here the three implications that Dong et al. themselves propose as an alternative. To perform this task, I gathered data from 8 European languages by consulting native speakers with short questionnaires. Also, some of the data is based on my own knowledge. The materials follow the same pattern as the one that is presented in the *Appendix Results of Cross-linguistic Investigation on 6 Weather Phenomena* (ibid. 13), as well as the structure of the table of results that I will present below[7]. I tested the following languages: Spanish (this language also appears in the article, but unlike the American variant examined by these authors, I will use Peninsular Spanish and the results are slightly different), French, Romanian, German, Russian, Latvian, Polish and Basque. The participants were required to provide the basic way to express that particular weather phenomenon, not a literal translation of the sentences. The meteorological phenomena considered were: fog, dew, frost, rain, snow, hail, which represent different types/ states of atmospheric water, but the last three will be treated as a separate category, namely precipitation, resulting in 4 types of phenomena, but I will specify whenever one of the phenomena in the precipitation category has another encoding pattern. Apart from considering the encoding format, I will also observe the presence or lack of explicit downward directionality.

		Spanish	**French**	**Romanian**	**German**	**Russian**	**Latvian**	**Polish**	**Basque**
Encoding type	Fog	A	A	Both	P	A	P	A	A
	Dew	A	A	A	A	A	A	A	A
	Frost	A	A	A	A	Both	Both	A	A
	Precipitation	P (rain &snow)	Both (rain)	P (rain &snow)	Both (rain &snow)	A	P (rain& snow)	Both (rain &snow)	A
		Both (hail)	P (snow &hail)	A (hail)	P (hail)		A (hail)	A (hail)	
Downward directionality	Fog	-	-	-/+	-	-	-	-	-
	Dew	-	-	+	-	-	+	-	-
	Frost	-/+	-	-	-	-/+	-	-	-
	Precipitation	- (rain &snow)	-/+(rain)	- (rain &snow)	-/+	-/+	- (rain &snow)	+	-
		+/-(hail)	- (snow &hail)	+(hail)			+(hail)		

Table 2. Encoding formats and directionality of fog, dew, frost and different types of precipitation in 8 European languages (A = argument type; P = predicate type)

[7] I will provide the data collected in the Appendix section.

The results reveal that the four types of atmospheric water do not behave uniformly in terms of encoding type: *fog* is expressed by argument type in 5 of the 8 languages, *dew* in all of them, *frost* in 6, although in Russian and Latvian the argument type can be used occasionally, and in the case of precipitation the situation is a bit more complex: for *hail*, 5 of the languages opt for argument type (whereas two others do that as an alternative mechanism), but for the rest of precipitation (*rain* and *snow*), only 2 of them use exclusively this encoding type, and the rest use either predicate or both types.

As for the first implication, whereby if fog, dew and frost are expressed by argument type (that is, the cases when the element responsible for the encoding of the meteorological event is the argument, not the predicate), precipitation (like rain, snow, hail) will have the same behaviour, in French it happens exactly the contrary: fog, dew and frost have the argument type, but precipitation is usually encoded with the predicate type, although the argument type can be sometimes used as a secondary possibility, but only in pragmatically restricted contexts; in Romanian it applies only in the case of hail, and in Polish, although fog, dew and frost have the argument type, precipitation is encoded by the predicate (only rain allows this pattern) or the argument-predicate type. Moreover, in German dew and frost are encoded by the argument type, whereas precipitation is usually encoded by the predicate type, although occasionally can admit the argument type as well, but it is definitely not the canonical encoding pattern in this language (like in French). It seems that the first implication can apply only to some precipitation types (most commonly hail) or to a few languages, such as Basque and Russian. What is clear is that there is no obvious correlation between the encoding type of the three weather phenomena and precipitation in general.

The second implication that indicates that when fog, dew or frost expressions explicitly convey downward directionality, precipitation will do so as well, we find that in Spanish, although frost can sometimes express directionality, as far as precipitation is concerned, only hail does the same, although rain and snow can be used with verbs like *fall* in non-canonical weather sentences. In Romanian, a similar thing happens: fog and dew express downward directionality, but only hail does the same in canonical weather sentences. In Latvian only dew can fall, but precipitation like rain and snow cannot. I consider that even for this implication the results can neither confirm nor refute the hypotheses proposed by Dong et al. (2020).

And the latter implication, whereby if a weather event expression conveys downward movement, it will be expressed by the argument type, is confirmed in all languages, except in the case of Polish, where the predicate alone can be sometimes responsible for the expression of rain and it also conveys a downward movement, because the verb for *rain* can be used also with the meaning *to fall*. In other languages, like Fijian, we can find something similar, where the name of the phenomenon, which usually appears as an argument, can be omitted and the predicate *bisa* (fall) can be used with an expletive only, taking the meaning of the meteorological verb. This means that, exceptionally, the argument type is not the only configuration that allows the explicit expression of downward directionality, even though it is the most common one.

Based on these results, I conclude that directionality does indeed entail a certain type of encoding, but it is rather the result of some semantic restrictions, not necessarily a behaviour specific to weather verbs. It must be taken into account that weather verbs that express precipitation denote the water falling in drops from the sky, which means that it would be redundant to express downward directionality with the help of a second or additional element. On the other hand, it is not clear how fog, dew and frost correlate with precipitation in terms of directionality or encoding types, since the selected languages do not show uniform behaviour in this respect.

5.2 Remarks on the diachronic development of weather verbs and directions for future research

Regarding the third implication formulated by Dong et al., several aspects related to the diachronic development of certain weather verbs should be mentioned. There are cases in which a verb of motion with downward directionality that has undergone a semantic change into a weather verb, losing its original meaning, can be used alone as a predicate with a null subject. As an example we have the diachronic development of the Finnish verb *sataa* ¨rain¨[8], which originally meant *to fall* and which in the case of several types of precipitation other than rain still requires an argument (Salo, 2011; Bleutu, 2012;

[8] Occasionally, weather verbs for precipitation in Finnish can combine with ¨a noun in the partitive as their only argument ¨ (Kolehmainen 2010a: 8 apud Salo, 2011: 415), but its syntactic function is still a matter of debate, since it is quite difficult to tell whether this element is the subject or the object, because it behaves almost like an object and it does not agree in number with the verb.

Eriksen, 2012). These languages initially employed the argument type with a semantically bleached verb that originally meant *to fall*, and eventually changed into an argument-predicate type, in which the weather verb became specialized in precipitation, but the argument was still needed. Probably the next step of this historical change is the possibility of dropping the argument and then, the conversion into a predicate type, with an atransitive weather verb that does not allow any argument.

Some languages ended up expressing the phenomenon through the predicate, but did not abandoned the verb of motion use and simply developed another meaning of precipitation, as it happened in Hungarian, where the verb for rain *esik* is used with both meanings *fall* and *rain* (Bleutu, 2012). In Polish we have something similar, where *rain* is usually expressed through the verb *padać* (fall; precipitate; rain) and the noun *deszcz* (rain) (Andrason, 2019), but as a result of the association of the two terms, the verb has ended up expressing *rain* by itself and being able to drop the argument (it can be used as an atransitive verb, thus predicate type), but without having lost its meaning of *fall*, as it happened with the Finnish verb *sataa*. This means that, in fact, in some cases, a verb of motion which expresses downward directionality can function alone as a weather verb, without requiring any argument, suggesting that exceptionally, weather expressions that convey downward movement or directionality could be encoded by predicate type, but only in a certain stage of the historical change, where the verb preserves the both meanings and the argument can be omitted.

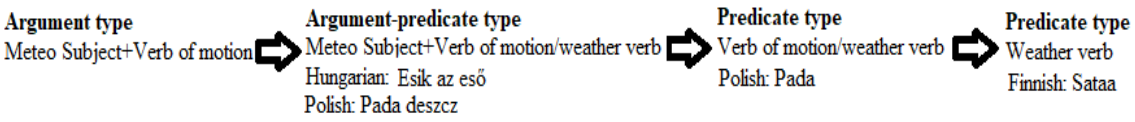

Figure 1. A possible representation of the successive changes of the weather sentences as a consequence of the semantic change of a verb of motion into a weather verb.

However, this is merely a hypothesis that could be the subject of future research which explores whether these stages can be confirmed historically. Dong et al. (2012) state that in Sinitic languages this hypothesis does not hold, as Old Chinese displayed the predicate type for precipitation, and Modern Chinese adopted argument type, but it may be a case of circular change, and Chinese is again in the first stage of the diachronic change, after having gone through the other stages. Another possibility is that this change only occurred in certain language families, but the database I have does not provide sufficient

information to develop and argue this hypothesis, although it can serve as a basis for future research.

6. The typological data

This section represents the analysis of the extended language sample in which I will present the encoding formats of the meteorological expressions for the two types of phenomena and I will observe if there is a semantic correlation between a certain type of encoding and the presence or lack of a weather product, susceptible of being conceptualized in the form of a subject, or occasionally an object. As mentioned in the previous sections, I will classify meteorological sentences according to the type of subject, and then I will make a subdivision according to the type of predicate.

6.1.1 The encoding formats for precipitation

Precipitation is the most visible meteorological phenomenon to human cognition which leads to a greater diversity of conceptualization constructions. We might think that in areas where rain is very common, languages have a variety of expressions to represent rain and also have weather verbs for rain, which correspond to the most customized pattern. Precipitation comes in many forms: rain, snow, hail, sleet, and in Eriksen et al.'s (2012) view, languages tend to opt for the same pattern for all kinds of precipitation.

Depending on the type of subject of these weather sentences, we can have: *Meteo Subject, Null Subject, Expletive subject* and *Abstract entity subject.*

I. Meteo subject

In this category belong those constructions where the meteorological phenomenon itself occupies the subject position and it is usually the rain or a hypernym for water/rain, when the language does not have a specific term for rain. That is why I subsumed the two types of subjects into one, namely Meteo Subject, because both refer to the weather phenomenon. Meteo subject type has the following subtypes:

I. 1. Meteo Subject and an intransitive verb

As mentioned above, I will delimit those cases in which the predicate is a motion verb. So I will simply label those verbs with valency one, which are not verbs of motion, as

intransitive verbs. This is a rather rare pattern, but present in some languages, such as Hindi (16), Jacaltec, Lavukaleve.

Hindi (Kachru, 2006: 165)

(16) bariʃ ho rəhī hɛ.
rain.F happen PROG.F PRS.SG
´It is raining. ´

I. 2. Meteo Subject and a verb of motion

In this subtype the verb of movement may (17-19) or may not (20) convey downward directionality, but I have not developed them into subtypes, although it must be said that verbs conveying downward movement are more common, and can be found in several language families. For example, Chinese has no weather verbs, but only expressions consisting of the noun denoting the weather phenomenon itself and a motion verb (*fall*).

Luwo (Storch, 2014: 234)

(17) Kɔ̀dh ù-pódò
Rain IPFV-fall:AP
´It is raining. ´

Gamilaraay (Giacon, 2014: 281).

(18) Yiiyuu=laa bundaa-gi
Rain=DIR fall-FUT
´It´s going to rain. ´

Rama (Grinevald, 1990: 211)

(19) Nah aa taak-iikar sii aats-i aingu
I NEG go-want rain come-down-TNS SUB
´I don't want to go because it is raining. ´

Oko (Atoyebi, 2010: 125)

(20) òsì áka-ca ọ́cẹ́n-ọ́cẹ́n ẹ́nyẹ́n ọ́nẹ.
rain FUT-come month-month year DEM.SG
´It will rain every month this year. ´

I. 3. Meteo Subject and a meteo verb (different root)

In this subtype, both the noun and the verb are responsible for expressing the meteorological phenomenon (21-22). The weather verb does not necessarily have to be used exclusively for precipitation, but it is one of the two elements responsible for encoding it. In this case, the verb has a different lexical root than the external argument and it is a verb specialized in precipitation, although it is not exclusively used for rain, but it is rather a verb that can combine with all sorts of precipitation.

Eton (Van de Velde, 2008: 233)

(21) mbèn ìnwáŋ

rain PST-rains

´It has rained. ´

Oromo (Stroomer 1987: 381 apud Mettouchi & Tosco, 2011: 311)

(22) bokee hir-roow-a

rain FOC-rain-IPFV.3M

'it will rain'

I. 4. Meteo Subject and meteo verb (same root)[9]

This type is very similar to the previous one, except for the fact that both elements share the same lexical root (cognate noun and verb). Although very rarely, some languages allow the presence of a cognate object which also refers to rain (23-24). These constructions are quite widespread in African languages of South Africa (Andrason & Visser, 2017), but I do not consider that they can constitute a separate subtype, as these cognate objects[10] appear in many other languages in non-canonical structures. This subtype and the previous one would correspond to Eriksen et al.´s *argument-predicate type*.

[9] Levin & Krejci (2019) suggest that from a semantic perspective, weather verbs that express precipitation can be perceived as events, in particular as ¨substance emission events ¨ and as ¨directed motion events ¨ (2019: 3). In the case of the latter, precipitation is interpreted as a downward movement under the force of gravity, whereas in the case of the substance emission, it is the sky that emits the substance. When the subject is the source (such as the sky, or weather it), the verb will have an unergative behaviour, because it instantiates a substance emission event, whereas when the emitted substance (the precipitation itself) is the subject, it will have an unaccusative behaviour, since it manifests a directed motion event.

[10]There is a whole debate about the argument status of these cognate objects. Bleutu (2012) and Kientpointner (2016) consider these cognates to be real arguments, bearing theta roles, but Álvarez-López (2021) takes a different view on the argument status of these nouns that appear with weather verbs and claim that they are not true arguments.

Turkish (Kienpointner 2016: 5)

(23) Yağmur yağiyor

Rain-NOM is raining

´It is raining. ´

isiZulu (Mchunu 1996: 48 apud Andrason & Visser, 2017: 155)

(24) Imvula i-yawu-na umvimbi

Rain SA-OA-rain continuous.rain

´The rain rains (it) continuous rain.´

I. 5. Meteo subject and an existential sentence.

Here, the meteorological subject appears in an existential structure, which can be with or without a copula, and I have classified as such those languages where either only a noun or a noun and a copula appeared. Of course, the type of copulative verb depends on the characteristics of that language.

Sanuma (Borgman, 1990: 160).

(25) ma te ma -ta -so -ö ha

rain 3:SG be:not -EXT FOC –NONASP LOC.

sa kali -pali kõ kite.

1:SG work -REPET return again.

´When it stops raining I´ll work again.

As for the geographical distribution of these subtypes[11], the pattern with a meteorological subject and a verb of motion is very common in almost all macro-areas, except Central Africa, East Africa and Southern Africa, where cognate constructions with a meteorological predicate that has a different lexical root prevail. Weather verbs with the same lexical root were identified in only two languages: Turkish and Ts´ixa, and the reason of being so rare seems quite obvious: even if in the case of the former, from a semantic point of view, the construction is redundant, in the case of the latter, there is also a phonetical repetition.

[11] Here I will present the areal patterns for each subtype, and at the end, after the presentation of the 4 types, I will describe the geographical distribution of every type.

Typically, the weather verb becomes specialized in precipitation, but it is not restricted to rain, and is used with other forms of precipitation and it actually might be fulfilling a supportive verb role, instead of that of a weather predicate per se. Moreover, the encoding with a meteo subject and a weather verb sharing the same lexical root, might be a previous step to its conversion into an atransitive weather predicate, at least for the most canonical type of precipitation.

On the other hand, the other subtypes of Meteo Subject (the intransitive and the existential structures) are much less frequent, but the intransitive verbs (those that are not verbs of motion) belong to the same syntactic configuration as the verbs of motion, a configuration that is also predominant in the case of the Meteo Subject type.

Figure 2. The geographical distribution of the Meteo Subject subtypes in Precipitation.

II. Null Subject

In this type of weather sentence, there is no subject because the verb is either atransitive and is entirely responsible for expressing precipitation, or transitive, and the phenomenon is represented by the direct object of this verb.

II. 1. Null Subject and atransitive meteo verb

This subtype corresponds to the atransitive predicate type (Eriksen et al., 2012), where the verb is the only element that participates in the weather construction (26-27).

It is the second most common pattern type for Precipitation, after Meteo Subject.[12]

Chukchi (Dunn, 1999: 340).

(26) qoo / etʔəm anə r-ilerʔu-ɣʔi

I.NEG.know probably so FUT -rain-INCH

´I don´t know, probably it will rain.´

Mapudungun (Zúñiga, 2006: 137)

(27) Wiya nga mawün-i.

yesterday AFF.rain-IND

´Yesterday it rained. ´

II. 2. Null Subject, a transitive verb and a Meteo Object

This is a rather interesting pattern, where a transitive verb, which can be specialized to precipitation or a supporting verb is combined with an object denoting an atmospheric phenomenon.

Basque (De Rijk, 2008: 1070, 1085)

(28) a. Euri-a egin behar du.

rain-ABS do be going to. TR.3SG.3SG

´It is going to rain.´

b. Euri-a ari du.

rain-ABS be busy TR.3SG.3SG

´It is raining.´

Hausa (Jaggar, 2001: 614)

(29) [kō dà â yi ruwā gȍbe], dōlè mù tàfi

even if 4PL.POT do rain tomorrow necessity IPL.SBJV go

'even if it were to rain tomorrow, we must go'

Bardi (Bowern, 2012: 467)

(30) Oola i-n- arn-n.

water 3-TR-spear-CONT

[12] Some authors point out the dual syntactic behaviour of these weather verbs (Levin & Krejci, 2019) and illustrate it with Italian as an example, since it counts with two auxiliary verbs, each selecting either an unaccusative verb (*essere* 'be') or an unergative verb (*avere* 'have') and it is argued that precipitation verbs can go with either of the two.

´It is raining.´

Within the Null Subject pattern, we can see from the map below that the subtype with a transitive verb and a meteo object has only been attested in an isolate language in Europe, namely Basque, an Afro-asiatic language, Hausa and a language from Australia, Bardi. We will see in the section devoted to static weather events, that the first two languages employ structures where the phenomenon is the direct object, for temperature conditions as well.

Figure 3. The geographical distribution of the Null Subject subtypes in Precipitation.

III. Expletive subject

In some languages, the subject position may be occupied by an expletive pronoun[13]. They are not very common constructions and in some languages may appear as clitics or

[13]In German, we can find a more pragmatically marked structure that is restricted only to atmospheric predicates, where the expletive pronoun is replaced by a demonstrative pronoun to express the speaker's attitude of dissatisfaction with the weather. A similar pattern can be found in some dialects of Dutch, where there is an alternation between the expletive and the demonstrative, the latter being more emphatic (Bleutu, 2012). There is also a debate about the nature of these pronouns, as in the case of the nouns that combine with a weather verb. Álvarez-López (2021) argues that, in order to have an argument status, it should have certain particular characteristics, such as semantic content and referentiality, as it is mandatory that the argument can be interpreted from a semantic point of view. Furthermore, when they are missing, the sentence becomes ungrammatical. And it seems that weather *it* is hard to interpret from a semantic point of view (although intuitively we can attribute it a semantic content in some weather expressions), which might suggest that it is an expletive.

suffixes attached to the verb. For instance, in Tukang Besi, weather verbs require a third person subject prefix (Donohue, 1999) or in Kamba, with weather verbs, the lack of a following NP imposes an expletive subject (Kioko, 2005).

III. 1. Expletive subject and meteo verb

The only element that combines with this subject is a meteorological verb and the subject has a purely grammatical function (31-32).

French (personal knowledge)

(31) Il pleut.
it-3SG rain-PRS.3SG
It rains.

Ute (Givón: 2011: 68)

(32) nʉvwa-y-ax
snow –IMM-it
´it´s snowing.´

III. 2. Expletive Subject, a transitive verb and a Meteo Object

In this subtype, the phenomenon is the object of a transitive verb, whereas the subject is an expletive pronoun. For instance, in Abkhaz (33), in weather expressions for all kinds of precipitation (rain, snow, hail), the phenomenon fulfils the role of the direction object of the verb *awrà* (´to do or to make´) and the subject is a dummy third person singular, transitive subject affix *–a* (Chirikba, 2003).

Abkhaz (Chirikba, 2003: 48-49)

(33) a. a- k˚à (ø-)a- (w-) wè- yt´ (=æ´k^{w} æ´weit´)
ART- rain it it make DYN- FIN
´It´s raining.´

b. a- sə̀ (ø-)a- (w-) wè- yt´
ART- snow it it make DYN- FIN
´It´s snowing. ´

c. a- k´ə rcx (ø-)a- (w-) wè- yt´
ART- hail it it make DYN.- FIN.
´It´s hailing.´

The pattern with an expletive subject is not a very widespread one, and the presence of an expletive pronoun might be due to the intrinsic constraints of the language, like an obligatory pronoun in subject position (English, French, German). As for the previous subtype, the construction with a transitive verb and a meteo object is very infrequent and within this language sample, it has only been attested as a dominant pattern in Abkhaz.

Figure 4. The geographical distribution of the Expletive Subject subtypes in Precipitation.

IV. Abstract subject

This is the last type of subject that can be used in a meteorological construction. From a semantic point of view, this subject does not refer to the phenomenon itself, but rather to the circumstances in which it occurs. However, it is not just an ordinary noun, as it denotes an abstract entity perceived either as the cause of the phenomenon (such as a deity, a divine force) (34), the origin, the place (35) or time in which it unfolds. This nominal subject takes an intransitive meteorological verb and even if it is present as a secondary encoding type in many languages, in quite a few of them it can be classified as the dominant one.

Oromo (Stroomer 1987: 381 apud Mettouchi, & Tosco, 2011: 312)

(34) waak'ii nu-u roob-e
God us-to rain-PFV.3M
'God has rained upon us'

Egyptian Arabic (Mettouchi, & Tosco, 2011: 312)

(35) id-dinya b-it-maṭṭar

ART-world PRS-IPFV.3M-rain

´The world rains´ > ´it is raining a lot´

Quechua (Weber, 1989: 327)

(36) Kanan hunaq tamya-nqa-churaq?

today day rain-3FUT-DUBIT?

´Might it rain today?

Vietnamese (Đình-Hoà, 1997: 16)

(37) Troi mua

sky rain.

´It´s raining.´

As shown in the map below, constructions with an abstract subject and a weather verb represent the least common type of meteorological expressions related to precipitation, and no subtypes have been identified in the Precipitation category, although as it will be reported in the following section, with regard to static meteorological phenomena, the abstract subject can occur in several syntactic configurations.

Figure 5. The geographical distribution of the Abstract Subject subtypes in Precipitation.

6.1.2 Areal and genetic patterns in Precipitation

As for the geographical distribution of the four types of subjects in Precipitation, we can observe that the meteo subject is almost inexistent in Europe and North America (except for the case of Tlinglit), although many languages can have it as an alternative mechanism (e.g. in French: Il pleut/ La pluie tombe). However, it is the most widespread pattern for encoding precipitation and is present in 52 languages in almost all macro-areas. It is also the dominant type in almost whole Africa and Central, Eastern and South Asia.

In Central and South America, two types are predominant: the Meteo Subject and the Null Subject, the latest covering more of the northern part. As for the Null Subject, it seems that there is enough evidence to say that it is a very common type in North America, but also many languages from Australia.

Based on these data, we can observe that the most frequent syntactic pattern in the case of precipitation is to have the phenomenon as the subject of the weather sentence. Since the phenomenon is material, it is perceived as something tangible that can become the protagonist of the event. This pattern is distributed all over the world and we cannot say that it is typical of only one specific area of the world.

The second pattern, found in 33 languages, is the construction with a null subject and its presence could be related to the fact that the prototypical weather sentence consists of an avalent predicate, due to the lack of semantic participants and having only an atransitive verb without any argument can be a default option in all the weather constructions, including precipitation.

The Expletive subject, on the other hand, is found in quite few languages, mostly in Eurasia (Western and Central Europe) and some Caucasian languages. Concerning the abstract subject, there seems to be no direct correlation with any area in particular, except perhaps for Southern Asia, although there is not enough evidence to draw this conclusion. In fact, the Abstract subject is more frequent as a secondary encoding pattern in several languages. Actually, the last two types are quite infrequent and can be attributed to areal phenomena: expletive subjects in European and Caucasian languages, and abstract subjects in Southeast Asian languages.

Figure 6. The geographical distribution of the 4 types of subjects in Precipitation

At the language family level, certain predilections for a particular type of encoding have also been observed. For example, in the Afro-Asiatic, Niger-Congo, Altaic families, constructions with a meteo subject and a verb of motion or meteorological verb predominate. Moreover, Oto-Manguean, Tucanoan and Sino-tibetan families seem to opt for the Meteo subject and a motion verb mostly. In the Indo-European family there are two predominant types: an expletive or null subject with a meteo verb or meteo subject with a verb of motion.

6.2.1 The encoding formats for temperature and light conditions

Temperature and light conditions belong to the category of static weather events and represent a rather heterogeneous class of phenomena, where sometimes the subtypes are difficult to delimit, but here are included those static events where there is no perceivable action, but rather a meteorological condition. I have reduced the category proposed by Eriksen et al. to temperature and light conditions, eliminating atmospheric or humidity conditions, and I have included here phenomena such as *sunrise* in *light* subtype and *sunset* in *darkness* subtype, since light conditions are perceived as a consequence or result of these phenomena. However, I have left out those events where light is visibly emitted by an astronomical object and where an agent (*the sun*) can be identified, those being

classified as *Sunshine*, a category that does not qualify for this typology because the sample is too small.

In most cases, expressions denoting temperature conditions were considered as dominant, because they are best represented in the language sample, but I relied on the idea that the whole class of static phenomena is one that differs from *Precipitation* from a semantic point of view, which may lead us to believe that there will be differences at the encoding level as well.

The classification according to the type of subject yields the same scenario: 4 types of possible subjects, each of them allowing a certain configuration. Below I will present the subtypes of each of them.

I. Meteo Subject

Here the meteorological phenomenon is expressed with the help of a noun that occurs either as the subject of an intransitive verb or in an existential construction, yet both would correspond to the argument type.

I. 1. Meteo Subject and an intransitive verb:

Here the subject is the phenomenon itself followed by a semantically vague intransitive verb (38). I have not created a special category for verbs of motion in this case because we are dealing with static meteorological phenomena and I do not consider this distinction relevant, but we can observe that there are languages in which a verb of motion appears in this subtype (39-40). A surprising case is Tulu, where the temperature conditions expressions feature the opposite phenomenon as the subject followed by a verbal structure that would translate as *less happen* (41).

Oko (Atoyebi, 2010: 333)

(38) ésírí ta ke àmá bè-éke-kí ca.
darkness cover PERF. but 3PL.SUB-FUT-CONT come.
´It is already dark but they will still come.

Burmese (Soe, 1999: 201,208)

(39) ei: la pi.
cold come PUNC
´It´s becoming cold.´

Imonda (Seiler, 1985: 144)

(40) si kilfia-f

night fall-PRS.

´the sun is setting´

Tulu (Bhatt, 1971: 112, 121)

(41) a. caḷi kaḍamE:w-oḍo

cold less happen.FUT-it-oḍo.THEME.

´tomorrow will be warmer´

b. sekE kadamE:tri

warmth less happen-PST.NEG.it.

´It is not cool today.

I. 2. Meteo subject and an existential structure

This subtype is represented by those constructions with a noun that denotes the meteorological phenomenon and a copula (42), or zero copula, which I classify as existential constructions[14]. It is also found as an alternative mechanism in languages such as Russian (43) and Rapanui.

Eton (Van de Velde, 2008: 171)

(42) èvéb éneê vá

cold V-be here

´It is cold here. ´

Russian (Bailyn, 2012: 115)

(43) Noč´.

night.NOM.

´It is nighttime. ´

[14] In Spanish, we can find weather constructions with three types of verbs *hacer* ‘make’, *hay* ‘be’ and *estar* ‘be’, which have different syntactic behaviour, since the first two verbs require a nominal and *estar* an adjective as complements. Also, there is a difference between the weather expressions with *hacer* (which belong to a different type and subtype in this typology) and *hay*, because the former has a causative component, whereas the latter is simply an existential (Bleutu, 2012)

Figure 7. The geographical distribution of the Meteo Subject subtypes in Temperature and light conditions

For static weather events, like temperature and light conditions, it seems that Meteo subject type has only two variations, one with an intransitive verb (which sometimes happens to be a verb of motion), a very common pattern in Precipitation, and an existential structure, which however has been found in only 3 languages: Jacaltek, Eton and Hindi, even if some languages have it as an alternative mechanism, as mentioned above. On the other hand, the expression with an intransitive verb is especially prevalent in Papua New Guinea and Northern Australia, but also in South and Southeastern Asia. It should also be mentioned that a language is more likely to use a Meteo Subject to express light conditions than in the case of temperature conditions, where it is almost impossible to detect the presence of any semantic participant. Light conditions, on the other hand, are related to the light emitted by a celestial body that can be identified as a potential agent, potentially leading to its encoding through a Meteo Subject.

II. Null Subject

In the case of this type of encoding, the phenomenon is conveyed by means of the predicate (verbal or non-verbal) or the direct object.

II. 1. Null Subject and atransitive meteo verb

The meteorological phenomenon is expressed exclusively by means of a zero-valency verb, which can be a weather verb or one that can be used in multiple contexts (45-46). This predicate can also be the result of the conversion of an adjective or adverb into a verb, as in Tiriyó (47), where the verbalizer -ma–ma(mï) is attached to the nominal root, ko(ko) 'night', resulting in the verb iko:ma(mï), ('to get dark) (Carlin, 2004)[15].

Maricopa (Gordon, 1980: 111)

(45) nya-hchur-k uuv´aw-k
when-cold-SUB rain-ASP
´When it is cold, it rains.´

Rama (Grinevald, 1990: 217)

(46) Nail tum-ting-atkut-su y-aakir-i
right dark-happen-ASP-SUB/upon 3-stay-TNS.
´upon getting dark, he stays´

Tiriyó (Carlin, 2004: 334).

(47) ikomain-je-wa n-a-ø-i irë-po
get.dark-NF-NEG.3 3.1TR-be-PRS-UNCERT DEM.INAN-LOC
´it doesn´t get dark there´

II. 2. Null Subject and meteo non-verbal predication

In this type of subjectless constructions, the phenomenon is expressed by a non-verbal predication, with (48) or without copula (49-51). The kinds of non-verbal predication that can occur in weather sentences are the adjectival and adverbial ones.

Mixtec (de Hollenbach, 2013: 383)

(48) Yoo ni kii o ma chi i´ni xeen ni yo kuu.
Month PST come INCL DEF then hot very PASS HAB be.
´Last month it was very hot.´

[15] The same happens in Lezgian, where the suffix *–da* is attached to an adjective like *čimi* (warm), *meq´i* (cold) and it acquires a predicative function. (Haspelmath, 1993)

Jacaltec (Craig, 1977: 9)

(49) caw ay ka´ yul te´ nah

very is heat in CL house.

´it is very hot inside the house´

Berber (Mourigh, 2015: 288)

(50) Ssxun!

hot

´It is very hot´

Russian (Kittila, 2012: 389)

(51) xolodno

cold.N.SG.PRED

´It is cold.´

II. 3. Null Subject, a transitive verb and a meteo object

This is very similar to the pattern I presented in the section devoted to Precipitation, where the direct object is the element encoding the weather phenomenon, and the subject is null.

Spanish

(52) Hace frío. (personal knowledge)

makes cold

´It's cold.

Huave (Kim, 2008: 285)

(53) La=m-a-yak ñu.rrar

PFV=SUB-TR-put heat

´It´s hot (outside)´

As far as the null subject is concerned, certain consistencies can be observed regarding the geographical distribution of its subtypes. In North and South America almost the only subtype available is the one with a meteorological verb. The same goes for the Caucasian languages. In the rest of the macroareas the pattern with a null subject and a meteo non-verbal predication seems to predominate, and almost exceptionally, the construction with a transitive verb and the phenomenon as direct object, found only in Europe and Central America.

Figure 8. The geographical distribution of the Null Subject subtypes in Temperature and light conditions

III. Expletive subject

As in the case of the null subject type, the weather phenomenon also falls on the predicate (verbal or non-verbal) or on the direct object of a transitive verb, but the subject is an expletive pronoun.

III. 1 Expletive subject and meteo verb

A weather verb which denotes a static weather phenomenon can also be combined with an expletive pronoun.

Martuthunira (Dench, 1995: 215).

(54) Nhiyu malumalu-npa-nguru-rru ngaliwa mirta-rru nhawu-layi.
this.NOM dark-INCH-PRS-now 1PL.INCL NEG-now see-FUT
´It´s getting dark now, and we won´t be able to see. ´

III. 2. Expletive subject and meteo non-verbal predication

This patterns consists of a non-verbal predication (adjectival, adverbial or nominal) with (55) or without copula (56), and a subject argument represented by an expletive pronoun.

German (Kang, S., & Kienpointer, M. 2020: 177)

(55) a. Es wird dunkel.

´It's getting dark´

b. Es wird hell.

´It's getting light´

Wari´ (Everett, & Kern 1997: 297)

(56) Xio na.

cold 3SG.RP/P.

´It is cold´

III. 3. Expletive subject, a transitive verb and a meteo object

This type is quite rare, but still worth mentioning because it is found in a well-known Indo-European language, namely French:

French

(57) Il fait froid. (personal knowledge)

It is cold.

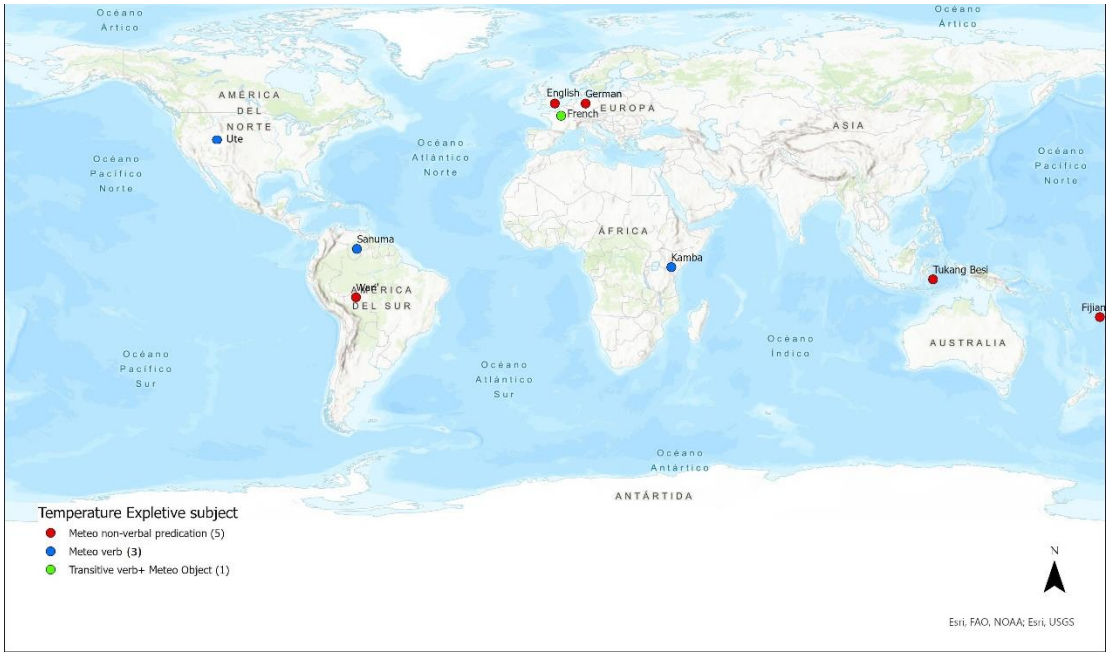

Figure 9. The geographical distribution of the Expletive Subject subtypes in Temperature and light conditions.

No correlation seems to arise between these subtypes of Expletive Subject and certain geographical regions. In Europe we encounter both the construction with the phenomenon as a non-verbal predication and the one with the phenomenon as a direct object. On the

other hand, the type of encoding with a meteo verb is found in one language in North America (Ute), one in South America (Sanuma) and one in East Africa (Kamba), but the distribution of these subtypes is so scattered that no conclusion can be drawn about any areal distribution pattern.

IV. Abstract subject

IV. 1 Abstract subject and a meteo verb

An abstract entity that fulfils the same function as in the domain of Precipitation occupies the position of the subject of a weather verb.

Turkish (Kienpointner 2016: 5)

(58) Hava kararıyor.
Weather-NOM is darkening.
´Dusk is falling´

Pichi (Yakpo, 2019: 435)

(59) Dì de kol.
DEF weather be.cold
´It´s cold´

IV. 2 Abstract subject and a meteo non-verbal predication

Unlike the previous subtype, here the meterological phenomenon is conveyed through a non-verbal predication. For instance, in Wanano (60), temperature conditions are encoded by a meteo non-verbal predication with a copula and a nominal head (*day*), whereas in Malagasy (61), the same abstract subject is used, but without a copula.

Wanano (Stenzel, 2004: 263)

(60) si-ri dacho hi-ra
be.hot-NOM day COP-VIS.IPFV.NON.1
´It's hot.´ (lit: The day is hot.)

Malagasy (Paul, 2000: 121)

(61) Mafana ny andro.
hot DET day

‘It’s hot.’ (lit. ‘The day is hot.’)

Japanese (Hinds, 2003: 86)

(62) kyoo wa atsui shi, …

today TP hot and

´It´s hot today, and…´

IV. 3 Abstract subject, a transitive verb and a meteo object

A single example (63) of such constructions has been identified, but I think it is worth mentioning as it is quite a plausible pattern, and the combination of transitive verb and meteo object is also found in other configurations I mentioned above.

Hausa (Jaggar, 2001: 432)

(63) Gàrī yā yi sanyī/zāfī yâu.

weather 3M.PFV do cold/hot today.

´It was cold/hot today.´

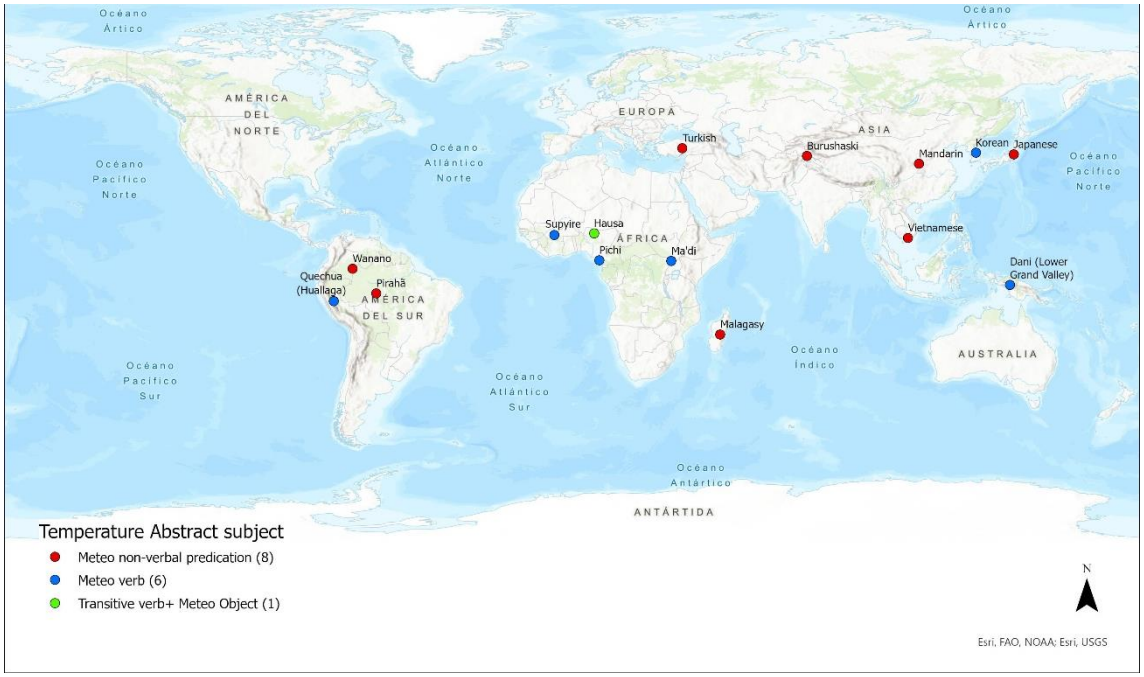

Figure 10. The geographical distribution of the Abstract Subject subtypes in Temperature and light conditions

Within the Abstract subject type, the most common is that the phenomenon is expressed through a predicate (verbal or non-verbal), the subtype with a transitive verb and a meteo

Subject being very rare (found only in Hausa). However, there is no concentration of any of these two subtypes in a particular geographical area.

6.2.2 Areal and genetic patterns in Temperature and light conditions

The most recurrent pattern in terms of the encoding of Temperature and light conditions is the Null Subject construction, where the predicate is the one that carries the semantic meaning of the weather event. It is encountered in 44 out of 85 languages, which represents more than half of the sample. It is found in almost all the languages of North and Central America, Southern and Eastern Europe, Southeastern Asia and Northern Australia. However, it is missing from Africa, Central and Eastern Asia, and most notably from Papunesia (with the exception of Fasu). Instead, Meteo Subject and Abstract Subject predominate in these areas, in almost similar proportions. However, in Central Asia there is a clear predilection for expressions with an Abstract entity subject, and in the southern region for those with a Meteo Subject. The pattern with a Meteo Subject is also concentrated in Papua New Guinea. On the other hand, the least frequent pattern is that with an expletive pronoun occupying the subject position, found mostly in Western and Central Europe.

Figure 11. The geographical distribution of the 4 types of subjects in Temperature and light conditions

In temperature and light conditions there is no physical element that can be taken as a possible subject of the meteorological event and having a null subject is expected, meaning that the event is expressed by the predicate and it can be observed that this is the most frequent pattern that appears almost everywhere (almost 52% of the languages), except perhaps Africa. The other types are less frequent and are located in some specific areas mentioned above. It is important to note that, most often, both Expletive subject type and Abstract type combine with a meteo verb, just as Null type does, meaning that in those three types, the phenomenon is encoded with the predicate, but I will interpret this data in more detail in the next section.

At the genetic level, very few correlations with a particular type of encoding can be observed, but we can say that in the Indo-European family, there is a clear predilection for a null or expletive subject, which could be explained by the fact that some of these languages are pro-drop (and use the null subject) and others are non-pro-drop and require an obligatory subject, which in the case of weather sentences is an expletive pronoun. In the Austronesian family the null subject also predominates, and in Trans New Guinea, the meteo Subject is the most common pattern.

However, I believe that this language sample is not sufficiently extensive to provide us with more data on genetic correlations, but it does reveal a fairly relevant picture of the geographical distribution.

6.3.1 Linguistic patterns in dynamic and static weather events

After having explored the different mechanisms in which languages can express these types of phenomena, as well as the areal or genetic consistencies, I will discuss some observations about the possible correlations between linguistic mechanisms and the two types of meteorological phenomena.

Regarding *Precipitation*, it can be observed that more than half of the languages opt for a Meteo Subject, which indicates that, at least in the case of this type of encoding, the phenomenon is expressed by a noun. However, it should be stressed that in the case of the other three types, the phenomenon can also be the direct object of a transitive verb, but these constructions are not so common. However, it must be pointed out that Precipitation potentially admits, in quite similar proportions, encoding types that would

correspond to what Eriksen et al. call *argument*, *predicate* and *argument-predicate type*, even if the balance seems to be in favour of the argument type. This corroborates to a large extent the hypotheses put forward by the authors mentioned in the previous sections. Erisken et al. (2012) state that the encoding variation of weather phenomena has a semantic basis, and Precipitation tends to be expressed by an argument or argument-type construction, corresponding to a meteo subject with a supportive verb (intransitive or verb of motion) or with a meteo verb, i.e. exactly the type that predominates in this classification. Furthermore, the authors state that precipitation is also one of the most salient meteorological phenomena and that this leads to a greater variety of possible encoding types and that is why we see that it can be encoded by all three types. On the other hand, within precipitation, there may be differences between the various types of phenomena. In the case of rain, some languages have reached the most customized pattern, namely predicate type, i.e. all those subtypes where the phenomenon is expressed only by the verb, but the rest of the precipitation types, such as snow and hail, require the addition of an argument (as in Finnish or Polish).

Similarly, Kienpointner (2016) states that, also due to semantic grounds, certain phenomena are more likely to be located in a specific place on the *meteo scale*, and in the case of rain, both the process and the entity involved are prominent, which indicates that precipitation can be expressed with all constructions within the phenomenon and entity area, or even cognate area. This is somehow a reformulation of the hypothesis advanced by Eriksen et al.

Moreover, Dong et al. (2020) observed that languages encode weather phenomena according to the saliency of the process itself or the presence of a tangible weather product, with the two binary features: [±Process] and [±Material]. When the process itself is more visible, the phenomenon is likely to be expressed by a predicate, and when a tangible weather product can be identified, the phenomenon will be encoded by a noun. However, precipitation possesses the two features [+Process] and [+Material] and this makes the encoding possibilities much more varied, which is confirmed by the results found in this language sample.

By contrast, when we look at the results of the other category, namely *Temperature and light conditions*, we can see that the Null subject prevails in more than half of the languages, implying that the predicate is responsible for encoding the phenomenon. On

top of that, the other two types, Abstract entity subject and Expletive subject, also imply that the phenomenon is expressed through a predicate, except in those cases where it appears as a direct object, although, as in Precipitation, the pattern with the phenomenon as a direct object is quite unusual.

However, the conclusion that can be drawn from these results is that in most cases, except when we have a Meteo Subject (17 out of 85) and when the phenomenon is a direct object (7 out of 85), in other words, only 24 languages out of 85 (28% of the total), languages encode these meteorological phenomena by means of a predicate, as Eriksen et al. (2012: 399) also state. These results also confirm the hypothesis that the lack of a visible entity or weather product leads to an encoding with a predicate. With respect to the *meteo scale*, these phenomena are rather located in the *phenomenon pole*, because it is difficult to identify or delimit any involved entities, but as explained above, with respect to light conditions, from an ontological perspective, daylight and darkness represent a direct consequence of the position of the sun, so here an entity could be identified, even if it is not as salient as in the case of sunshine, where an argument type pattern is expected.

6.3.2 Feature cross in dynamic and static weather phenomena

I also wanted to investigate whether certain languages tend to select the same kind of subject for both types of weather phenomena, to see if the differences in encoding between dynamic and static phenomena are actually due to a general characteristic of the language itself that prescribes a certain type of construction for all weather phenomena.

However, as can be seen in the map below, most languages have a combination of two subject types, with a few exceptions: most languages (29) that choose a null subject for precipitation do the same for Temperature and light conditions. These languages are mainly found in North and South America, Southern Asia and Northern Australia. The same goes for the expletive subject: most languages (6) choose this type of subject for both types of phenomena, but no particular areal pattern is necessarily observed.

However, in the majority of languages no parallelism can be observed between the two types of subject, which indicates that languages have two distinct ways of encoding the two types of phenomena.

These results may also explain the exceptions found in the two types of phenomena. As far as precipitation is concerned, it was expected that languages would opt for a meteo subject, but the fact that 47 languages use a pattern which is distinct from the meteo subject, may be due to the influence of the pattern for temperature and light conditions, which is null subject, present in 29 of them and expletive subject in 6 of them. The reverse situation can also occur, in which languages opt for a pattern other than null subject for temperature and light conditions, influenced by the pattern for precipitation (14 of them). There is likely to be a certain tendency towards a homogenisation of the intralinguistic patterns, which may distort the expected encoding variation caused by semantic differences.

Figure 12. Type of subject crossing in Precipitation and Temperature and light conditions.

7. Discussion and conclusions

7.1 Discussion

In this dissertation, I have offered a new proposal for classifying meteorological constructions based on the framework developed by Erisken et al. regarding the semantic distinctions between various weather events, but approaching the formal typology from a different perspective. I have finally focused only on two main types of weather events,

namely *Precipitation* and *Temperature and light conditions*, which I considered to represent the two major categories of phenomena: dynamic and static. However, the emphasis was not on the element that carries the meaning of the weather phenomenon, but on the type of subject with all its variations. Thus, this resulted in 4 possible subject types, each with a certain number of possible variations and we found that these 4 types allow only certain elements in the configuration of the meteorological expressions. In contrast to the approach of these authors, I believe that this new typology provides a better picture of the constructions that can actually be found in natural languages. Although it seems that the spectrum of possibilities is wider, it turns out that some constructions that were part of the formal typology proposed by them, are in fact alternative mechanisms.

While it is true that their typology logically exhausts the possibilities of encoding meteorological phenomena, it does not necessarily reflect the existing linguistic reality. I mainly refer to argument/predicate transitive type constructions, which are classified as such only if both arguments are expressed and if the agent is a nominal subject, not an expletive pronoun. These types of constructions are not only very rare, but also secondary encoding types, and do not represent the canonical structures of those languages. On the other hand, constructions with a null subject, a transitive verb and the phenomenon as a direct object are indeed infrequent, but represent the dominant pattern in certain languages, such as Spanish (for temperature conditions) and Basque.

Also, even if I do not have enough evidence (although it deserves further research), the types of encoding may reflect other features of the language itself, but this does not mean that it is separable from the semantic differences between the different types of phenomena, as we have seen in the previous section, which showed that there is a quite strong correlation between the linguistic mechanisms used and the two types of weather phenomena.

I believe that this paper fills a gap in the formal typology of meteorological expressions, especially by appealing to a representative language sample, but has some limitations, particularly in terms of the capacity to determine the basic encoding type of each language. As explained in the Methodological issues section, I chose the dominant pattern, but the data base was mostly built on the examples provided by the descriptive grammars, yet very few had a section dedicated to this topic, so it is difficult to decide if the examples found actually represented the most common way native speakers expressed

those phenomena. On the other hand, the three implications elaborated by Dong et al. were verified based on questionnaires filled in by native speakers, who were encouraged to provide the basic sentence they would use to express those 6 meteorological phenomena. Obviously, it is difficult to apply this methodology to 100 languages, but I believe that the methodological criteria considered in developing this typology were adequate.

The results found are consistent with the three typological proposals discussed in the theoretical part of this dissertation, but I believe that this research topic deserves to be explored in more depth.

7.2. Conclusions

In this study I have approached meteorological constructions from a typological perspective. I began by exploring the existing literature and I developed a theoretical background by analysing three apparently distinct typological perspectives, but which turned out to converge in various aspects, such as the semantic delimitation of weather expressions based on the highlighting of either the process or the entity/ weather product. Then, I tested the consistency of the three implications proposed by Dong et al. (2020) in a sample of 8 Indo-European languages and found that at least the first two do not hold even in a small group of languages. Then, based on the third implication, I discussed the diachronic evolution of some verbs of motion into weather verbs and proposed a possible representation of successive changes of the weather sentences as a consequence of the semantic change of a verb of motion into a weather verb.

After presenting the methodological issues I have encountered, I provided a morpho-syntactic classification of the weather sentences according to the type of subject and described the combinations patterns with that particular type of subject, resulting in 4 major types: *Meteo Subject, Null Subject, Expletive subject* and *Abstract entity subject* and several subtypes for each one of them. The empirical basis for this typology of the encoding formats for precipitation and temperature and light conditions was a 99 and 85 language sample.

I also examined the recurrent patterns within a certain geographical area or language family for each type and subtype and I discovered that in some cases, there are certain

areal consistencies. Furthermore, after analysing the data, I observed that there is a correlation between the linguistic mechanisms employed and the type of phenomena.

Precipitation seems to allow various types of encoding because both the process and the weather product are salient, but there is still a predilection for a meteo subject. However, for temperature and light conditions, the lack of a visible semantic participant makes the process stand out, which leads to an encoding with a predicate, hence a null, expletive or abstract subject.

I also crossed the subject type in both categories of weather phenomena to see whether certain languages tend to select the same kind of subject for both types of weather phenomena, which could suggest that the differences in encoding between dynamic and static phenomena are actually due to a general characteristic of the language itself that prescribes a certain type of construction for all weather phenomena. However, the results revealed that most languages choose a different type of encoding for the two classes of phenomena, which confirms that semantic differences do indeed result in encoding variations. However, I believe that there is still a long way to go in establishing an exhaustive typology of weather constructions and more studies like this one are needed to shed light on this topic.

Abbreviations:

1 1st person
2 2nd person
3 3rd person
4 4th person
AFF affirmative
AP antipassive
ART article
ASP aspect
AV actor voice
CL classifier
COM comitative
CONT continuous
DEF definite
DEM demonstrative
DES desiderative
DET determiner
DIR directly
DUBIT dubitative
DUR durative
DYN dynamic
ERG ergative
EXPL expletive
EXT extended
F feminine
FIN finite
FOC focus
FUT future tense
HAB habitual
IMM immaterial
INAN inanimate
INCH inchoative
INCL inclusive
IND indicative
IPFV imperfective
LOC locative
M masculine
N noun
NEG negative
NF non-finite
NOM nominative
NONASP non aspect
OA object agreement /pronominal clitic
PART partitive case
PASS passive
PERF perfect
PFV perfective
PL plural
POT potential
PRED predication
PROG progressive
PRS present
PST past
PUNC punctual
REPET repetition
RP/P realis past/present
SA – subject agreement

SBJV subjunctive	TNS tense	UNCERT uncertain
SG singular	TP topic particle	VIS visual
SUB subject	TR transitive	

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Appendix

The 100-language sample:

Macroarea	*Africa*	*Eurasia*	*Australia*	*North America*	*South America*	*Papunesia*
Family Languages	**Afro-Asiatic** Berber Hausa Oromo	**Afro-asiatic** Arabic Hebrew	**Mangarrayi-Maran** Mangarrayi	**Algic** Cree(Plains)	**Arawakan** Arawak	**Austronesian** Cebuano Fijian Rapanui Indonesian Paiwan Tagalog Tukang Besi
	Austronesian Malagasy	**Altaic** Mongolian Turkish	**Bunuban** Gooniyandi	**Siouan** Assiniboine/ Stoney	**Araucanian** Mapudungun	**Border** Imonda
	Central Sudanic Ma´di	**Austro-asiatic** Vietnamese	**Gunwinyguan** Enindhilyakwa/ Anindilyakwa	**Chibchan** Rama	**Cariban** Tiriyó	**Dagan** Daga
	Eastern Sudanic Lango Luwo	**Basque**	**Nyulnyulan** Bardi	**Hokan** Maricopa Seri	**Chapacura-Wanham** Wari´	**Solomons East Papuan** Lavukaleve
	Niger-Congo Eton Kikamba Pichi (creole) Supyire Swahili Oko Zulu	**Burushaski**	**Pama-Nyungan** Martuthunira Gamilaraay	**Huavean** Huave	**Matacoan** Wichí	**Sepik** Yessan-Mayo
	Khoe-Kwadi Ts'ixa	**Chukotko-Kamchatkan** Chukchi	**Tangkic** Kayardild	**Iroquoian** Cherokee	**Mura** Pirahã	**Torricelli** Kamasau
	Sandawe Sandawe	**Dravidian** Tulu		**Keresan** Acoma	**Puinave** Wãnsöjöt/Puinave	**Trans-New Guinea** Amele Dani Fasu
	Weastern Saharan Dagaza	**Eskimo-Aleut** Greenlandic (West)		**Kiowa-Tanoan** Kiowa	**Quechuan** Quechua	**West Papuan** Maybrat
		Hmong-Mien Hmong Njua		**Mayan** Jakaltek	**Tucanoan** Wanano Cubeo	
		Indo-European English French German Greek (Modern) Hindi Persian Russian		**Mixe-Zoque** Zoque	**Tupian** Guaraní	

		Spanish				
		Japanese		**Muskogean** Koasati	**Yanoman** Sanuma	
		Kartvelian Georgian		**Na-Dene** Tlingit		
		Korean		**Oto-Manguean** Mixtec Chatino		
		Nakh-Daghestanian Lezgian		**Siouan** Hidatsa		
		Northwest Caucasian Abkhaz		**Uto-Aztecan** Ute		
		Sino-Tibetan Burmese Mandarin Meithei		**Wakashan** Makah (+Nuuchahnulth)		
		Tai-Kadai Thai				
		Uralic Finnish				

The languages that have been replaced from the WALS sample:

1. Ma´di, Moru-Ma'di (instead of Bagirmi)
2. Luwo, Nilotic (instead of Krongo)
3. Ts' ixa, Kalahari Khoe (instead of Nama)
4. Kamba, Bantoid (instead of Luvale)
5. Oko, Nupe–Oko–Idoma (instead of Yoruba)
6. Pichí, Krio (instead of Sango)
7. Dazaga, Tebu (instead Koyraboro Senni)
8. Mongolian, Mongolic (instead of Khalkha)
9. Tulu, Southern Dravidian (instead of Kannada)
10. Bardi, Nyulnyulan (instead of Maung)
11. Gamilaraay, Southeastern Pama-Nyungan (instead of Ngiyambaa)
12. Anindilyakwa, Anindilyakwa (instead of Tiwi)
13. Seri, Seri (instead of Kutenai)
14. Huave, Huavean (instead of Karok)
15. Cherokee, Southern Iroquoian (instead of Oneida)
16. Tlingit (instead of Slave)
17. Chatino, Zapotecan (instead of Otomí, Mezquital)
18. Hidatsa, Core Siouan (instead of Lakhota)
19. Stoney, Core Siouan (instead of Wichita)
20. Ute, Numic (instead of Yaqui)
21. Arawak, Caribbean Arawakan (instead of Apurinã)

22. Tiriyó, Cariban (instead of Hixkaryana)
23. Wãnsöjöt, Puinave (instead of Yagua)
24. Wanano, Tucanoan (instead of Barasano)
25. Cubeo, Tucanoan (instead of Barasano)
26. Cebuano, Greater Central Philippine (instead of Chamorro)
27. Yessan-Mayo, Tama Sepik (instead of Alamblak)
28. Kamasau, Marienberg (instead of Arapesh)
29. Fasu (instead of Kewa)

Data from the Cross-linguistic Investigation on 6 Weather Phenomena

Spanish
1. Está lloviendo.
2. Está nevando.
3. Está granizando. / Está cayendo granizo.
4. Hay niebla.
5. Ha habido rocío esta mañana. /Ha caído un rocío esta mañana.
6. Ha caído una helada esta mañana. /Se formó escarcha en la ventana. /La ventana se cubrió de escarcha.

French
1. Il pleut.
2. Il neige.
3. Il grêle.
4. Il y a du brouillard.
5. De la rosée s'est formée sur l'herbe.
6. La fenêtre s'est couverte de givre. Du givre s'est formé sur la fenêtre.

Romanian
1. Plouă.
2. Ninge.
3. Cade grindină.
4. E ceață. / Se lasă ceața./ Se înceţoşează./ Cade ceața.
5. Cade roua.
6. Se depune chiciura.

German
1. Es regnet. / (Der) Regen fällt.
2. Es schneit. / Schnee fällt.
3. Es hagelt.
4. Es ist neblig.
5. Es liegt Tau (Das Gras ist mit Tau bedeckt)
6. Draußen herrscht strenger Frost.

Russian
1. Idët dožd´. / Padaet dožd´.
2. Idët sneg. / Padaet sneg.
3. Idët grad. / Padaet grad.
4. Poshël tuman.
5. Etim utrom byla rosa.
6. Utrom vypal inej. / Morozit / Stoit moroz.

Latvian
1. Līst.
2. Snieg.
3. Krīt krusa.
4. Migla / apmācies laiks.
5. Uzlaižas rasa.
6. Iestājās sals. Uz logiem izveidojās raksti.

Polish
1. Pada. / Pada deszcz.
2. Pada śnieg.
3. Pada grad.
4. Jest mgła.
5. Byla rosa rano.
6. Byl przymrozek / Mroz rano / Byl szron na oknie.

Basque
1. Euria ari du.
2. Elurra ari du.
3. Kazkabarra da/ari du.
4. Lainoa dago/sartu da.
5. Ihintza izan da goizean.
6. Goizean izotza egin du.