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Un/natural Disasters II Epistemology and Ontology of Multiple Simultaneous Un/natural Disasters

Abstract

In this paper, the author continues developing a philosophy of *multiple simultaneous un/natural disasters* (MSD) in terms of further development of epistemology of know-how, and the ontology of appearance/reality of such disasters, mostly in the light of globally relevant disasters during 2021, namely floods in central China and in Germany and Belgium, wildfires in Siberia, etc. The paper is a continuation of the research from the initial paper "Un/natural disasters, Philosophy of multiple simultaneous un/natural disasters" (Krkač, 2022) which concerns philosophy of MSDs during 2020, mostly in Croatia within the global context. The main issues in this text are epistemology and ontology of and in multiple simultaneous un/natural disasters, in terms of know-how and appearance-reality distinction. These are being analyzed in conceptual-morphological terms, the goal of which is reaching clear concepts of know-how and reality of and in MSDs which seem to have importance for our understanding of MSDs, deciding, and acting before, in, and after them. The critical finding is concerned with the fact that beyond global MSD hotspots, and beyond special services equipped and trained to act before, during and after MSDs, there is little understanding of and preparedness for MSDs, globally speaking and on average. This overall lack seems to be obvious, and the clearest proofs of it are MSDs in the period between 2020 and 2022.

Keywords: Un/natural disasters, multiple simultaneous disasters, epistemology, ontology

Introduction

The present text (which is the continuation of the topic from the text "Un/natural disasters, Philosophy of multiple simultaneous un/natural disasters", Krkač, 2022) tries to develop the same topic further in-depth, but concerning only some epistemological

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and ontological questions. It is concerned with a quite simple basic question: If the world changes rapidly in a manner that threatens human survival, then how does this influence philosophy? For example, the number of globally relevant natural disasters in the period from 1980 to 2020 is on the rise, namely, in 2020 it is 4 times higher than it was in 1980 (from 200 to 800, see: Krkač, 2022). There is also a rise in the probability of multiple (un)natural disasters around the globe. This text isn't concerned with the philosophy in the *shadows of disasters*, or with the philosophy *of these disasters*, rather with the *philosophy in the world of these disasters*; namely, how philosophy should describe and understand such a new world if at all.

The mentioned disasters aren't too far away like the death of our Sun (4.5 billion years, give or take), aren't quite improbable like the hit of an asteroid which would cause an instant extinction-level event or ELE (no matter if many asteroids ranging from 2-3 meters to 1-2 kilometers can hit Earth and cause an ELE), rather they are here and now, they will probably stay here, and become larger in scale, speed, and magnitude in the near future. However, philosophers were and are surprisingly uninterested in the philosophy of disasters, not to mention multiple simultaneous un/natural disasters (MSD). Ancient Greeks, Medieval, and modern philosophers weren't much interested in eruptions of volcanoes, floods, climate changes, famines, various pandemics, etc. At best they said something on various wars, or on the rising and fall of various kingdoms, realms, and empires. In the 20th and 21st centuries they are still concerned mostly with various wars and, in recent decades, with climate changes. Perhaps this last concern has raised a bit irrational ideology called longtermism which needs to be addressed and excused.

Excurse 1 Apocalypticism (religious) or longtermism/long-termism (secular and/or philosophical) is a belief held by more and more intellectuals, with philosophers included, which says that the end times are imminent. In developed religions, we also have a theological discipline called eschatology which deals with various scenarios concerning the end of the world and the human race. However, this time many scholars are included (see Torres, 2017, 2021; Torres seems to change his mind and now thinks that longtermism is a dangerous belief). "Longtermism is the view that we should prioritize the far future of humanity, primarily through preventing human extinction and improving the lives of our distant descendants." (Balfour, 2021). Two things are worth mentioning, namely (1) longtermists consider very far future events that have a high probability and/or near-future events that have a low probability, and (2) they are concerned mostly with ethical implications of such events. Both, (1) and (2) seems to be dubious, because (1) they miss considering ongoing events and models that construe them as e.g. 10 or 20 times worst than they actually are (this would be the least pragmatic thing to do), and (2) because they miss taking into consideration ontological and epistemological issues related to such events previously to the ethical ones (precisely what will be done hereafter).

Critics of longtermism (such as Torres) think that it is the most dangerous belief of our time for other reasons, such as that the belief and acting on it itself can contribute to such events (Torres, 2021). However, longtermism is irrational if it is based on the probability of too far events and low probability events, and not on the ongoing and perhaps short-term high probability events. Philosophically speaking, it seems that taking ethical and moral issues into account, without taking ontological and epistemological simultaneously or even previously to ethical, creates a bad philosophy, if ethical issues imply these as settled. One can have a moral obligation to act in a particular manner only if it is possible to act in that manner and to decide that is a question not of ethics but of the theory of action, and of know-how. Ethical considerations should be taken into account, but what kind of account would it be if it doesn't relate to obvious unsolved ontological and epistemological issues? Similarly, moral reasoning is *empty* if it doesn't take into account the very action that is viewed under its moral aspect? Because of these reasons, a philosophical aspect of defending longtermism should be abandoned altogether. In short, this is not an essay in longtermism. In the words of Torres, "you should care about the long term but reject the ideology of longtermism" (Torres, 2021).

Structure of the analysis

Therefore, the question or the issue hereafter is: How a philosophy of the 21st century describes the world of the 21st century? Does the rapidly changing or already changed world influences philosophy in any way or not? As said, in previous times philosophers weren't too much worried about similar changes. However, nowadays changes seem to be global, life-threatening, and on the verge of being irreversible, so this time they should be worried. If they could be and should be, then the question is: does this influence basic philosophical concepts like those of knowledge, existence, morality, human action, world, good, and beauty, and if it does, in which way? We are not concerned here with facts because they were mentioned previously, and it can be concluded with some degree of certainty that philosophers said little about disasters, and even less about the philosophy of disasters (Krkač, 2022). Here, we are concerned with the description and understanding of these facts, or sometimes with their denial.

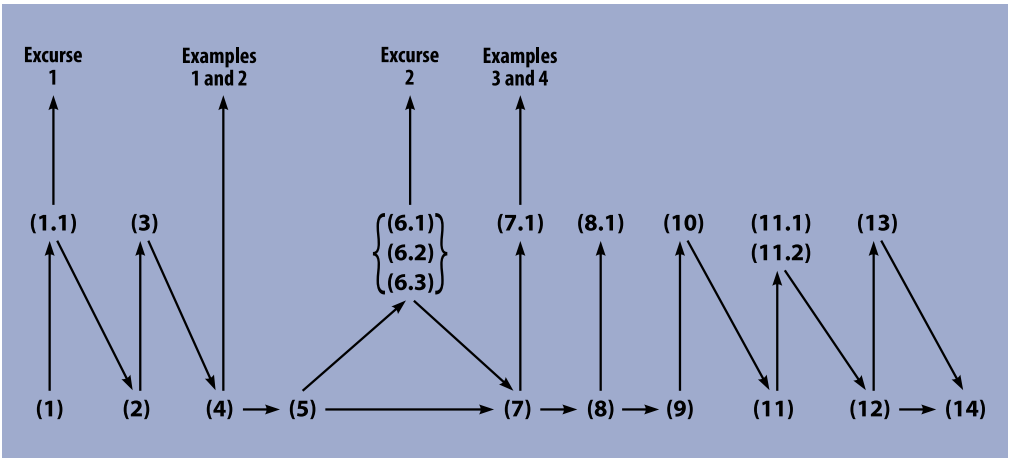
Generally speaking, the relation of philosophers and the contemporary world that surrounds them is quite limited. Neither the events in the surrounding world influence them much or in a high percentage, nor do they eagerly strive to understand and influence the worldly events. This goes both ways in the majority of cases. The world isn't too interested in what philosophers do, and philosophers aren't too interested in what is going on in the world. This may be called a mutually satisfying disinterest. Here it should be noted that the world still decides to pay philosophers to be disinterested, but not the other way around. Of course, there were and are philosophers

engaged in different spheres of public life, but it appears that the percentage of them is extremely low.

Why this is so, is hard to answer. Perhaps it has something to do with the nature of philosophy being understood as dealing with highly general, universal, and abstract questions, but also with the academic process of becoming and being, and ceasing to be an academic philosopher. The additional reason, besides the two just mentioned and on which perhaps the majority of philosophers and the rest of the world agree, is that philosophy simply cannot substantially contribute to the previous, present, or future state of the world. However, if philosophy possibly and in some minute way influences the world and vice versa in all other ("normal") times, then it should influence it on these ("revolutionary") days as well *(ceteris paribus)*. Philosophy surely influenced the world in other times. Therefore, it should influence it now, too.

For a moment let us just imagine a philosopher dealing with issues in philosophical anthropology 200 years ago and in 2022. Survival of humans, their influence on the environment, and their possible and perhaps necessary artificial improvements weren't the issues 200 years ago, but nowadays they seem to be quite important. In short, it seems that the answer to the question "What is a human being?" hasn't been the same in 1820 and in 2020 or at least it hasn't got have the same weight. Describing and understanding a human being then and now imply two quite different descriptions and understandings. This goes for all other questions and answers of philosophy which have to take into account contemporary realities of life.

Basic statements in the text will be given in numerated series of propositions (1), (2) …, and the general order of propositions and the structure of the argument can be presented as follows.



Therefore, the propositions describing and strongly limiting the present topic are the following.

(1) Generally, the topic here is the philosophy in the 21st century in the shadow of natural and unnatural *dangers to human survival* under the aspect of epistemology and ontology. These *dangers* are analyzed as relevant emergencies or *disasters* on global level given by the criterion and the contemporary reality of disasters (see Krkač, 2022).

(1.1) In the view of the mentioned *dangers to human survival* or *disasters* in (1), hereafter not all or individual disasters but MSDs (multiple simultaneous un/natural disasters) which are in constant rise (see: Krkač, 2022) are the primary topic. FMSDs are the topic only under the aspect of know-how and habits (epistemologically) and appearance and reality and identification (ontologically). (Both aspects presuppose the aspect of human action which will be mentioned first because, in terms of pragmatism and personalism not only that know-that presupposes know-how, but man-exists also presupposes "man-acts"; see Wojtyla, 1969:3-25.)

Acting reason in disaster: The holy disease of tomorrow

The 46th fragment of Heraclitus says: "[He used to say that] thinking is (an instance of the) sacred disease [and that] sight is deceptive." (τήν τε οἴησιν ἱερὰν νόσον ἔλεγε καὶ τὴν ὅρασιν ψεύδεσθαι), (DK B46; see Robinson, 2003). Some commentators think that the word "thinking" can be replaced by the word "philosophy", and if this is correct, then philosophy is a *sacred disease* or *epilepsy* which was historically thought to be conditioned by the divine, and a sign of spiritual power or genius (see Kirk, 1954; Kirk, Raven, 1957; Kahn, 2001). Heraclitus seems to be saying that thinking or philosophy, rather than epilepsy, as a sacred disease, is the sign of divine intervention, of genius, or simple of a human being. One can speculate that what he said can be understood as: *Thinking* is what makes us humans *brilliant*.

However, the 21st century with its natural, man-made, and mixed disasters shows us, perhaps, that in times of crises humans tend to think less, not more, or not to think at all, so in a way, they become not greater, but lesser humans; not brilliant but *dull* beings.

(2) If philosophy supplies clear concepts about phenomena and human action, then it could be relevant in the near future more than before (presupposed in 1.1). In terms of its major topics, the following could be important concerning basic human concepts, phenomena, and actions in the face of more frequent continentally and globally relevant MSDs (multiple simultaneous un/natural disasters): appearance and reality of disasters, and know-how or human actions in disasters. So, thinking and acting clearly and reasonably, having suitable know-how, and understanding reality may be of importance for the survival.

However, there are many obstacles to this goal (2), namely false or even invented facts, wrong conceptual analyses, bad argumentation, false beliefs, irrational and unreasonable actions, etc., and these could present the basic dangers of future survival of humans. Thinking and acting clearly and rationally could become an exception instead of a rule.

There is an additional difficulty here. Humans can easily think and act rationally in the face of a single disaster taking place in a limited area during a short period of time. However, the number of continentally and globally relevant MSDs (multiple simultaneous un/natural disasters) that could last for a long time is a new situation for which humans still didn't invent adequate prevention, so the danger of irrational thinking and acting is much bigger due to the fact that these are (for the great majority of humans) completely new circumstances (the duration of COVID-19 pandemic raised many irrational concepts, argumentations, and actions). Only in some quite small regions humans are accustomed and prepared for MSDs (e.g. combination of earthquakes, floods, fires, various incidents, etc.). Actions of these communities could be taken as good examples for actions of all in the near future. We should get sick and get the holy disease. We should all get *reason in action* or perhaps *an acting reason*.

An *acting reason* is nice, and perhaps already a used phrase, but what exactly is the point of it? *Practical reason in an MSD* could be the best candidate for the answer. Practical reasoning in principle and, applied in the simplest cases, is quite clear, given that practical reasoning is reasoning which leads to a decision how to act (which is the most common description), or goal-directed reasoning. And it is clear that any goal G1 if it can be best realized by performing an action A1, then a doer D1 should or ought (practically speaking) to perform an action A1 (see Milgram, 2000, Wallace, 2000, O'Connor and Sandis, 2010).

(3) The general principle of practical reasoning (presupposed as important in 2) with all its theoretical problems raises questions if applied to actions (A1) previous, during, and/or after MSDs (multiple simultaneous un/natural disasters). Individuals, small or big groups under an MSD may or may not identify the real goal (G1) they have (a group may have a goal to save their property without realizing that if they do so, they significantly lower the probability of their physical survival). Searching for alternative actions (A2, A3) that would bring about the goal (G1) and would be much safer, faster, more efficient, etc. may be important.

During MSDs people often don't have a clear decision-making process applied. Choosing the right action (A2 instead of A1 or A3), as being more reasonable then other, is often clouded by a shock, fear, lack of calm, existing habits, and routines. Some actions could be so improbable and unreasonable that they could be considered as practically impossible to perform or impossible to be reasoned clearly under an MSD.

All actions have consequences, even non-actions or omissions. In disaster times it seems extremely important to choose an action that will produce the most acceptable consequences (explicated from 3). However, such choices may include alternatives that are considered unacceptable. The most important feature in practical reasoning in such disaster is a mixture of lack of know-how of particular types of actions and severe influence of irrationality; not only formal mistakes in practical reasoning (which is often a consequence), rather irrationality manifested due to shock, stress, fear, panic, etc. (which is often a cause due to the fact that there's not only one but more than one simultaneous dangers). Therefore, it seems highly questionable how to apply practical reasoning in such disasters. Practical reasoning shouldn't be just correct, but at the same time and in the same degree, fast, precise, and almost routinely performed. However, most humans didn't develop such practical reasoning habits for MSDs (multiple simultaneous un/natural disasters).

Previously said seems to lead to the issue of a number of professionals who have such practical thinking habits and who follow them routinely. Given that such disaster is defined as a un/natural phenomenon that causes collapse of some or many elements of daily life, which cannot be managed by resources of the community which suffers such collapse, it seems highly questionable if such professionals are sufficient, or if there is a need for a number of non-professionals that are educated to help in such situations? Of course, given that such contemporary disasters are rather new, it is also questionable if these professionals are prepared for reasoning and acting under such circumstances (obvious mistakes in performing during the 2020-2022 COVID-19 pandemic, e.g. in the EU and globally, during a series of floods, wildfires, tornadoes, etc. suggest that humans aren't prepared, or at least that the decision-makers aren't prepared, and that in the majority of cases they have failed).

Practical reasoning concerning an individual's or a group of non-professionals' or common people's short-term actions in such disasters is one thing, but practical reasoning by professionals or whole communities regarding long-term actions is another. It concerns various technical solutions, which at the moment we simply don't have, and that can prevent various disasters in long periods of time (e.g. systems against flooding, wildfires, earthquakes, tsunamis, pandemics, etc.). So, the next question is – what do humans need to know in terms of habits, routine actions, and customs, and in terms of technical innovations and inventions in order to properly conduct practical reasoning in disasters? This question connects practical reasoning with the epistemology of know-how, and later with the ontological question of appearance and reality.

Epistemology of multiple simultaneous un/natural disasters

Perception and understanding of a disaster

Given that perhaps the most important epistemological notion related to disasters and therefore to MSDs is know-how which will be at least explicated in the present section, previously it should be at least mentioned that there are notions lesser than knowledge which, if not explicated properly, could lead to an inappropriate understanding of knowledge and know-how. One among these notions is perception and subjective impressions regarding a disaster, which in many cases can be unrealistic and can create false beliefs that can lead to improper know-how and action-in-disaster (especially in an MSD).

Research on this matter is vast and diverse, but only concerning individual disasters. It may be divided by criterion of the general perception of a disaster, and particular phenomena such as risk-perception, shock, stress, resilience, adaptability, but also by the criterion of disaster preparedness, and perception of particular types of disasters (see Havenaar, de Wilde, van den Bout, Drottz-Sjöberg, and van den Brink, 2003). Generally speaking, the vast majority of researchers, mostly in the field of psychology, agree that perception of a disaster can be and actually is unrealistic, meaning that a disaster is perceived to be greater than it measurably is due to high values of mentioned factors such as shock, stress, fear, unpreparedness, even an exposure to media contents, and similar. Therefore, it seems that on average an individual will exaggerate on the perceived disaster, i.e. will perceive it as being bigger or stronger than it measurably and comparatively is.

However, perception differs between different times; it is relative to a disaster (before, during, and after it), and different groups and/or individuals can perceive it differently. Namely, before the disaster and/or being at a safe distance from it can lead to the perception of it as being smaller or weaker than it is contrary to the period of a disaster and/or being in the region of it. It seems that this multiplies if there is a case of MSD (but this isn't proven by results and it is only a hypothesis). Now, how much, depends. Namely, e.g. on average if an earthquake is level 5, people will perceive it as level 6 or 7, and if pandemic or fire is level 3, people will perceive it as 4 or 5 on some imaginary scales, and if these disasters create an MSD, the perception will be 2 or 3 times higher than reality suggests. Such exaggerated perceptions of a disaster can cause various mental states which further on cause inability to use know-how and to act properly.

Concerning measurement of perception, objective criteria and factors are used on average, but some advanced subjective criteria which are compatible with the objective ones, such as "subjective resilience at the household level" (see Lindsey, Tanner, 2017),

a combination of objective and subjective criteria, such as the notion of "human security" (see Bambals, 2015) or "social capital" (see Mayer, 2019).

Results of various researches on individual disasters support hypotheses of multiplication of exaggeration of perception concerning MSDs. For example, Brown, Daigneault, Tjernström, and Zou concluded that "results show that being struck by an extreme event substantially changes individuals' risk perceptions as well as their beliefs about the frequency and magnitude of future shocks" (see Brown, Daigneault, Tjernström, and Zou 2018). A similar is recorded in children and adolescents concerning "post-traumatic growth" (see Bernstein & Pfefferbaum, 2018). In some hotspots, not only the professionals, but the population as well, seems to be fairly prepared, e.g. people in Alpine valley regions of Italy with a lot of floods are being prepared better after each new disaster, and their perception of it is fairly realistic. Miceli, Sotgiu, and Settanni concluded the following: "Overall, results showed that most of the respondents were fairly well prepared to deal with a future flood disaster. Correlational and regression analyses indicated that disaster preparedness was positively associated with risk perception." (see Miceli, Sotgiu, and Settanni, 2008). However, if disasters are rare, the preparedness and risk perception may be quite low (in the case of hurricanes see Kyne et. al., 2020).

(4) The overall estimation for individual disasters is that perception is exaggerated on average, but that it becomes more realistic with the higher number of perceived and experienced disasters. Given that everything else is the same, it seems right to hypothesize that similar would happen with MSD (and this could be a threat to required practical reasoning given in 3).

The only problem is how high the exaggeration of an MSD would be, and how many times an MSD needs to repeat in order for a population to perceive it realistically. This is a problem because, if many times are needed, then the risk of depopulation is much higher. All of this may be the case, but it needs to be researched concerning MSDs. Special concern should be given as said to different variables such as being outside or inside of the region of an MSD, and perception before, during, and after it, perception by professionals and non-professionals, by groups, and individuals, etc.

Last but not least, information on disasters in media such as radio and television, and nowadays on social networks should be added, besides being an excellent source of quick and correct information and therefore of perception, can also create an *exemplification effect*, namely, that people watching a disaster on for example TV would perceive it bigger than it really is (for the case of Hurricane Katrina see Westerman, Spence & Lachlan, 2009). Therefore, the use of media obviously should be professional, rational, reasonable, and practically useful concerning the representation and perception of a disaster, and this may be the case for MSDs as well.

Know-how in disaster

It seems beyond doubt that knowledge-in-disaster should be described as disaster know-how. Know-how is in fact a smaller part of the greater whole consisting of special habits, customs, routines and similar which are developed for disaster-times (for know-how see Krkač, Lukin and Mladić, 2013). This seems fine in a time of a single disaster. However, it seems problematic in times of multiple simultaneous (mutually related or not) un/natural disasters (MSDs). General population simply doesn't know what to do or how to act in such situations because these seem to be new circumstances for the majority of world population.

> **Example 1:** A new German-Belgian example of flash floods in 2021 is extremely illustrative. Namely, a number of fatally injured people never in their lives encountered such sudden and strong flash floods. Some of them ran into basements and got trapped there, but some of them moved to the higher floors of buildings without any idea that the whole building could collapse, and which unfortunately happened in some cases. The alternative was to move into the flood which could also end fatally. However, the river's infrastructure was built for 100-years floods, not for 1000-years floods, and this has to be reconsidered in the light of the probability of future floods and the cost of new infrastructure (see Wikipedia, URL: https://en.wikipedia.org/wiki/2021_European_floods).
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> A new Russian example of wildfires around Yakutsk in Siberia shows that fires created smoke that can permanently damage lungs and other organs. The town has 285,000 citizens and the nearest town for evacuation is hundreds of kilometers away. It is obvious that staying in town and evacuating presents almost equal threats to the survival of the population (see Wikipedia, URL: https://en.wikipedia.org/wiki/2021_Russia_wildfires).
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> A new Croatian example was a series of earthquakes in Zagreb during the pandemic. People ran from their apartments on the streets, but there they couldn't maintain physical distance important for not spreading COVID-19 because the streets are narrow. Fortunately, there was no significant rise in the number of the newly infected (described in Krkač, 2022).

So, it seems that it is not just about know-how generally, rather about new know-how which, in many situations, we simply don't have, didn't invent, develop, and acquire. We don't know what to do and how to do it. Obviously, one needs to understand the nature of the phenomenon in order to understand the nature of know-how needed if one is a part of such a phenomenon.

> **Example 2:** The lack of people with at least some know-how for the times of disasters (MSDs) is obvious. If natural disasters are to become more frequent, sudden, stronger, and more destructive, should professionals (e.g. employees of closed businesses, etc.) whose work is threatened at the time of disasters (e.g. earthquakes,

floods, pandemics, etc.) be allowed and encouraged to change their occupations, that there is lack of, at the time of disaster (medical staff, firefighters, ambulance staff, etc.)? Should everybody who is capable have a sort of *disaster second-job*? For example, in the EU on average 17% of people (over 16 years of age) practice artistic activities every day (Eurostat 2015; let us assume that most of them are professional artists), and in the Republic of Croatia almost 10%. Whichever way of argument is taken, there is a large group of people who would get the opportunity to work and get paid during and after disasters in deficit occupations through additional education. If contemporary catastrophes had occurred before the Internet and its massive use (in the Republic of Croatia the beginning of which was in 1992), the percentage of professionals whose work would be endangered would be much higher, but the same could happen if the Internet collapses locally or globally during a future disaster. The whole education system, and also parts of the health, economic, judicial, and other systems could collapse.

The lack of know-how shouldn't be taken dispassionately. First of all, it relates to know-that in an unusual manner. Namely, know-how in-disaster (MSD) depends on innovations and inventions that can save millions of lives, and such things, while being technical or social (cultural) innovations or inventions, basically include a specific know-that or knowledge of a particular theoretical relation, law, law-like regularity (or correlation), or mechanism related to measurable facts about the disaster phenomena. Many of such innovations and inventions we don't have yet.

Secondly, and as mentioned in Example 2, the lack of know-how doesn't seem to concern professionals only, but non-professionals as well. Developing new procedures, habits, and routines isn't just the problem of professionals dealing with multiple simultaneous un/natural disasters (MSDs), but, given that non-professional help could be crucial, is as well the problem of non-professionals. Inventing, accepting, and practicing new social activities, almost a new way of life or culture, seems to be as important as well as inventing new technologies that could prevent disasters (MSDs).

Thirdly, the lack of know-how concerns the lack of coordinated actions under the MSD not only in a community directly under the influence of a disaster, but also globally, since contemporary disasters can have global consequences due to their suddenness, size, speed, and abruptness (for example, the smoke from wildfires in Siberia in 2021 mentioned in Example 1 was moving across Alaska, and smoke from Western Canada and California wildfires covered almost half of Canada and the USA significantly lowering the air quality).

(5) Realistic perception of an MSD is a condition of a proper know-how (as claimed in 4). Now, it is common knowledge that for some disasters we have technical solutions (e.g. floods prevention in Europe, special architectural structures for earthquakes in Japan, etc.). We also have some cultural solutions (e.g. special practices

performed by the majority of members of communities in situations of earthquakes in Japan). However, all of the existing technical and social/cultural know-how is globally quite limited, and there is no global set of technical and/or social know-how solutions. This is of course only a hint and at best serves as a hypothesis (as shown in Table 1).

Table 1. Global preparedness for continental/global MSDs (a hypothesis).

Multiple simultaneous disasters know-how	Professional	Non-professional
Technical (engineering)	✓/×	×
Social-cultural (way of life)	✓/×	✓/×

Concerning MSDs, there are also good local examples (in Japan people acquired habits on how to act in a situation which is a combination of an earthquake and tsunami). There are world regions in which MSDs will occur more likely and it seems that they will be the first to develop new professional and non-professional know-how. However, in some regions, technical know-how follows such possible development, but in others, it doesn't due to various reasons (economic underdevelopment, political reluctance to solve problems, etc.). Generally speaking, the world seems to be caught off guard faced with the size, frequency, suddenness, and speed of contemporary multiple simultaneous natural disasters, not to mention unnatural ones.

Know-how in a simple disaster is something that we have. We know how to act in a case of a fire, flood, earthquake, heavy rain, pandemic, industrial incident, great traffic collisions, etc. However, how to act during an MSD is something that only a small minority of us knows. Some common questions that were raised around the world in 2020-2022 were the following:

— Is it safer to stay in house after an earthquake if there is a pandemic spread outside?
— Is it safer to stay in a house during a flash flood, or to try to escape it if starts to collapse?
— What should we do if a flood is going on simultaneously with an industrial incident?
— What should we do in a case of an earthquake followed by a tsunami? Etc.

These and similar questions concerning our particular know-how during MSDs create a series of paradoxes for which we do not have solutions in terms of standard and useful know-how (as shown in Table 2, again in terms of a working hypothesis).

Table 2. Global know-how in a disaster (a hypothesis)

Disaster know-how	Simple disaster of one kind (fire, flood, earthquake etc.)	multiple simultaneous un/natural disaster
Before a disaster	✓	×
During a disaster	✓	×
After a disaster	✓	×
Individual (personal, habitual)	✓/× (only locally)	✓/× (only locally)
Collective (technical, engineering)	✓/× (only locally and on a small scale)	✓/× (only locally and on a-small scale)

The possible reason for not having know-how lies mostly in the very nature of an MSD, but there are perhaps a few more particular reasons that extend from our dealing with individual disasters. Namely, there seem to be few types of global know-how that we lack in the present situation of any MSD:

(6.1) the lack of correct information, or having the various misinformation based on which one could form propositions and draw conclusions (this may be intentional misinformation, or accidental, mainly due to various biases such as *survivorship bias* in which one draws conclusions based on remaining things, survivors or similar and neglecting the lost or destroyed, and this may happen in cases of various MSDs because it can create a series of false beliefs due to its complexity (see Smith, 2014, Shermer, 2014)),

(6.2) the lack of individual know-how in terms of personal knowledge in a disaster situation, namely, what kind of know-how an individual has to have in order to maximize her/his own and survival of the others during an MSD, and the lack of collective know-how in terms of collective habits given that collective actions are substantially different from individual, implying at least a certain level of organization, strategy, and tactical solutions,

(6.3) and the lack of technical (engineering) solutions for particular probable individual disasters, but also in MSDs.

How to solve these *lacks* (6.1–6.3) isn't clear (except perhaps (6.1) in which there are known procedures of minimizing the amount of misinformation and disinformation).

(7) On one hand, what seems to be clear is that globally speaking we have local communities accustomed to MSDs, and perhaps their know-how should be used

as a starting point for a global know-how, or global disaster-routines and culture. On the other hand, we still; do not have many global technical solutions that can prevent such disasters, and minimize their devastating effects.

It also seems very hard to develop this issue further because among other things the present author doesn't have sufficient *understanding* (*Verstehen*) of the phenomenon in question.

(7.1) It is obvious that epistemological issues (given in 4–7) naturally lead to another sphere of understanding, which is commonly understood as ontological (see proposition 1.1).

Ontology of multiple simultaneous un/natural disasters

Appearance and reality: denying the reality of a disaster

The ontology of MSDs tackles many traditional ontological questions in what seems to be a new context. Some of the questions are: do MSDs really take place or do they really exist, how much of their phenomena are only appearances, and how much are realities (partly resolved in 4), how to identify and calculate them, how to categorize them, how to detect their causes, processes, effects, beginnings, duration, and endings, etc.?

Perhaps the most common phenomenon regarding the 21st-century disasters under the view of their appearance and reality, as an opposite to their *exaggerations* (given in 4) is their *denial*. Regarding *climate change deniers* Lee McIntyre writes the following:

"Climate change denial represents the biggest, most important case of science denial in our time. The reason for this is not only that climate deniers are so dug-in and widespread (especially in the United States), but that *the costs of inaction* are projected to be catastrophic." (McIntyre, 2021).

A certain percentage of people simply deny that disasters exist. Therefore, any further discussion with them is fruitless or moves into the sphere of science-fiction, fantasy, or dystopia (there are other possibilities or responding options; see Cassam, 2019). The disasters deniers should be differentiated from the professionals who are skeptical or hesitant regardless of whether they are working for the public, state, or private institutions (so that they may be under various private, political, or other pressures).

Excurse 2: For example, without professional explications, or texts on popular science websites, deniers cannot understand, for example, the paper "Observation-based early-warning signals for a collapse of the Atlantic Meridional Overturning Circulation" (Boers, 2021). A major Atlantic Ocean current, namely the *Atlantic Meridional Overturning Circulation*, or *AMOC* (the Gulf Stream being a part of it) is responsible for the majority of the climate conditions in the northern

hemisphere and it has lost a lot of its stability during the 20th century. Will it go beyond the threshold of irreversibility is still an open question, but it is close to it as far as the data show. For a nonprofessional disaster denier, it takes a lot of climatology knowledge, knowledge of current data, and understanding of sea currents, sea salinity, etc. in order to understand what he or she is denying, and, to be fair, most deniers simply lack such knowledge.

Most deniers aren't professionals, rather complete amateurs in the field of a particular disaster. Contrary to the first impression, the completely amateur deniers, no matter if they come in small or big numbers are less dangerous than amateur deniers educated in fields completely unrelated to the field under which a disaster falls. They can produce much more harm based on their alleged expertise of being professionals in some completely unrelated field of science or technology, not to mention religion or humanities. On one hand, in the vast majority of cases, deniers don't have the slightest shred of proof of their expertise in the field of a disaster, neither in their education nor in their scientific experience or results. Skeptical or hesitant, professionals, on the other hand, often do, and they have scientific arguments for their claims. Also, their rhetoric is often very careful, hesitant, and obviously scientific.

Example 3: To deny a wildfire, a flood, a tsunami, an earthquake is very hard. However, the deniers deny that the number of disasters, their magnitude, and speed isn't caused at least in part by global warming because they deny the contemporary global warming and human cause of it. So, the denying is indirect. In the case of a pandemic, to deny it isn't hard. The deniers deny various things; e.g. the pandemic itself since its proclamation is partly a political act, natural nature of its cause (SARS-CoV-2) claiming that it is produced in and escaped from a laboratory, the use of protective masks, and of the vaccine claiming that it is ineffective, or that mandatory vaccination violates their human rights, etc. Almost the same situation happened in 1873 in Stockholm when the vaccination rate dropped to 40% compared to about 90% elsewhere in Sweden due to the anti-vaccination campaign, which led to the smallpox epidemic which further on led to vaccination uptake and the end of the pandemic (see Nelson, Rogers, 1992). A similar may happen during 2022 all around the world where the anti-vaccination campaign was strong during 2021. In most cases, the deniers deny basic facts that they could check themselves. They do not offer different facts, so they are forced to claim that available facts are fabricated. Finally, they often don't supply any testable proof of facts being fabricated for some further, often conspiracy purposes.

Multiple simultaneous un/natural disasters (MSDs) due to their suddenness, size, global nature, speed, and the damage they produce will influence the deniers for sure; perchance mildly so that they will eventually admit the phenomenon's existence, or perhaps harshly so that they would extinct due to their irrational actions (during the

summer and fall of 2021 more than 90% of COVID-19 hospitalizations and 80% of deaths in Croatia were of not vaccinated citizens, and still the anti-vaccination campaign is strong, see Croatian Government, 16/09/2021). The existence of disaster deniers isn't just the problem in itself. They generate a problem for the rest of the population, not only for themselves but also for others, by damaging themselves (their families for one thing). However, let us assume that the issue of general denying is solved one way or another. What remains are particular deniers, and hesitant people.

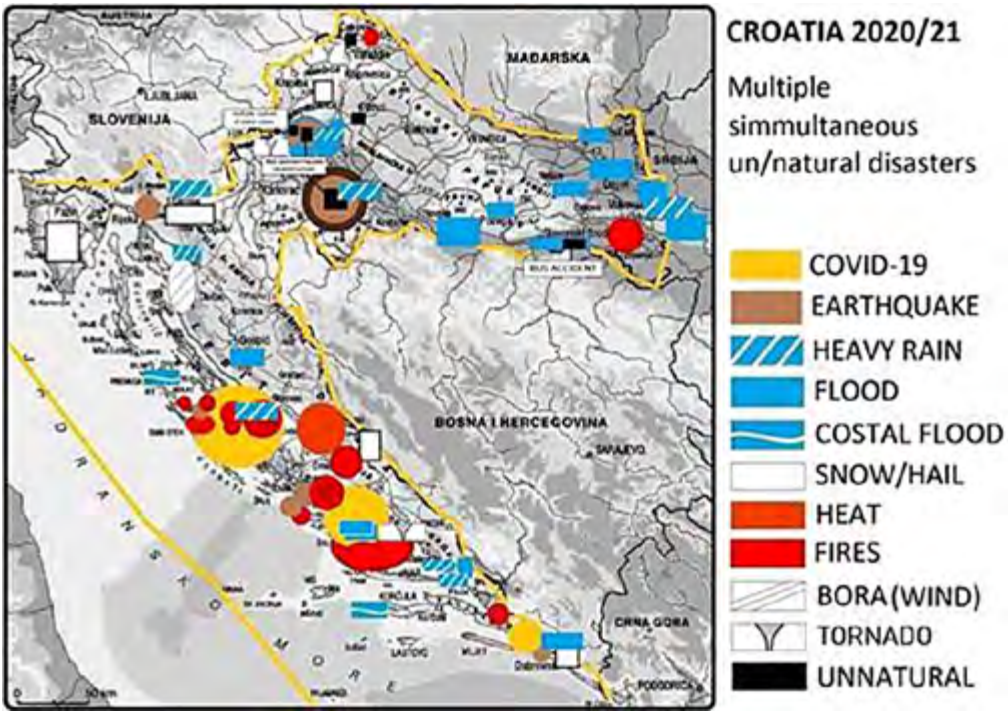
The existence of a disaster is a matter of a criterion that is in majority of cases sufficiently clear. Following the previously mentioned criterion of a disaster, we can repeat that "a disaster is a serious disruption occurring over a short or long period of time that causes widespread loss which exceeds the ability of the affected to cope with a disruption by using its own resources" (Krkač, 2022). A denier of a disaster can object to such criterion in many ways, the most important of which targets the element of "exceeding the ability of affected to cope". For example the 2021 August wildfires in the Mediterranean region (namely Spain, Portugal, Greece, and Turkey) were such that they obviously "exceeded the ability" of these countries to cope with them (for example Croatia sent Canadair airplanes for such situations to Turkey and Greece in order to help since fires were approaching populated areas on the south coast of Turkey where there are tourist resorts, and the urban area of Athens in Greece).

A less strong objection would be to object to the concept of "a serious disruption". Here one can differentiate between local, continental, and global disasters. Two further criteria seem to meet the reality here; one is concerned with the disruption of previously "normal" life of a community (e.g. concerned with water, electricity, gas, food, and housing supply), and the other is concerned with the disruption that cannot be solved by means of the affected community, meaning that the help of others must be quick enough to solve the disruption before major losses (e.g. in human lives, environment, infrastructure, etc.). Namely, sufficiently efficient and quick help even from others is sometimes simply impossible, and losses are predictable.

These objections perhaps apply and multiply in a case of MSDs. First of all, the criterion of an MSD isn't completely clear. This point is understandable since mankind doesn't seem to have a social or cultural memory of similar events in its history. For example, in Croatia during 2020-2021 there were a series of global disasters (such as the COVID-19 pandemic), continental disasters (two of the strongest earthquakes in Europe in the last 140 years). However, given that Croatia is a small country with its geographical and climate variety, every year it has a series of local and national disasters that regularly overlap in time, space, suddenness, strength (becoming stronger every year, etc., the whole state suffers from disasters during every year). For example, in the case of a pandemic, Croatia didn't produce vaccine (actually it devastated its previously internationally recognized *Institute of Immunology*), in the case of the

Petrinja earthquake it didn't have sufficient substitute houses (although it should have them in the official reserves), etc. So, these were all disasters happening in the same place, at the same time, and simultaneously or in a series (as shown in Illustration 1). To continue with the previous example, the majority of them were "exceeding the ability of the affected to cope" no matter if they were at the local, national, continental, or global level because they exceeded their levels. This also replies to the second objection concerning "a serious disruption".

Illustration 1. Multiple simultaneous un/natural disasters in Croatia 2020/2021 (by author)



Example 4: In the case of Croatia it is quite obvious that many problems fall under the criterion of a disaster; some locally, some nationally, some continentally, and some globally (as shown in Illustration 1). That there was a multitude of them is also obvious. Further on, many of them overlap in time and place. Although they were different in kind, there are hotspots in particular regions, but also there are exceptions. For example, the famous hurricane-strength wind Bora (etymology suggests the origin in the expression "evil wind", see Gluhak, 1993) is specific for the northern part of the Croatian Adriatic coast (Velebit channel) and it can blow at the speed of more than 300 km/h. Similarly, extreme heat (over 40 °C) is specific

to a particular region around the town of town Knin. However, floods (flash floods and flooding of rivers) are specific to all continental Croatia from Karlovac to Slavonia.

The exception was flooding in the continental parts of the Adriatic region (not counting coastal floods). Wildfires are specific to the Adriatic region (the coast and islands in the context of the Mediterranean) but there are exceptions in the Continental region as well (in terms of natural and unnatural causes, i.e. incidents). There were other disasters as well, but they were of a more local character (e.g. hail and similar, as shown in Illustration 1).

So, in short, they were all disasters, they were multiple, simultaneous in a small region, and exceeded the ability of the affected to cope with them. Some of them were mutually related, and some weren't. Given all suggested here, and shown in Illustration 1, it seems quite remarkable that people in Croatia don't take this new phenomenon seriously. Denying that it is partially related to global warming is still the narrative of a group of people (which to some degree overlaps with denying e.g. the pandemic, the efficiency of a COVID-19 vaccine, etc.).

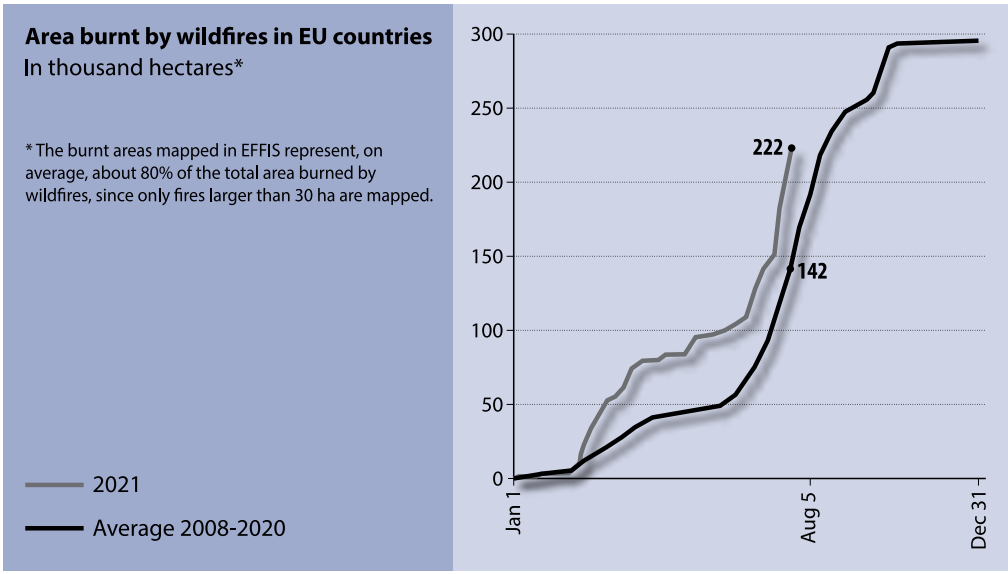
Perhaps an interesting element of MSDs is the relation between natural and unnatural disasters. In cases of floods and earthquakes this is obvious. Not caring properly for anti-flood systems (of various kinds) or not preparing properly for an earthquake and not responding properly after it, which causes man-made or man-contributing disasters, show that such MSDs are at least partially unnatural or man-made disasters. However, in cases of wildfires, this is not clear. Namely, there is at least one obviously paradoxical situation and it doesn't seem to be a specifically Croatian phenomenon (as shown in Illustration 2), but an overall Mediterranean one.

Illustration 2. Quite strange wildfire regions in Croatian coastal area (by author)

Example 4: (*cont.*) According to some imprecise data (in fact there are no precise data), 95% of all wildfires in Croatia are caused by humans, and only 5% by natural causes (thunder is the most common among them). Out of this 95%, almost 94% are caused by human carelessness and 6% by misconduct. Other research suggests that carelessness includes cigarette butts, improper lighting of fires, burning of weeds and plants, etc. Intentional fires include pyromania, but also, and this is extremely interesting, burning of weeds and plants in order to facilitate the legal conversion of the forest area into a construction site. New articles is have been suggesting this point for the last 14 years (2007-2021). Therefore, there is a strong suspicion that wildfires are in the vast majority unnatural disasters in terms of their cause. The percentage of such wildfires caused by converting a natural site to a construction one is unknown, as well as the number of such requests which are easily made before local administration.

There is a striking similarity between this case in Croatia and cases in Spain and Greece where there is a similar thing going on and they have a similar number of wildfires with similar statistics of causes. Stuart Braun in his text "Europe is burning: Four explanations" offers the following one: "So while arson and natural causes such as lightning are equally to blame for starting the fires, extreme heat has increased their intensity and is the real culprit for the destruction wreaked across fire-hit regions. This is why at least 55% more area has burned across Europe by August 5 than the average over the previous 12 years." (Braun, 2021, as shown in Illustration 3).

Illustration 3. Wildfires in EU 2020 up to August 5 (source EFFIS, Braun, 2021)



Source: European Forest Fire Information System, August 5, 2021

(8) In short (and in relation to what has been said in 4), MSDs (multiple simultaneous un/natural disasters) are very hard to deny, but some people still deny them to some degree.

To continue with the previous example, on 07/08/2021 Greek Prime Minister Kyriakos Mitsotakis said in Ilia, during the wildfires in Greece: "If there are only a few people who have doubts about whether climate change is real, I am inviting them to come here and see for themselves" (Index, 06/08/2021). Perhaps a huge fire in an urban area or a city with e.g. 1 million citizens is needed for deniers to acknowledge such disasters, but this is a high price to pay for such irrational thinking and acting.

(8.1) Concerning individual and small disasters it is easy to deny them due to their features, however, in the case of an MSD (a multiple simultaneous un/natural disaster), this seems to be very hard, again due to their features. On one hand, it is not clear how to respond to general disaster deniers. On the other hand, response to disaster particular features deniers and hesitant people may be clear in terms of simply understanding their hesitancy of acknowledging the reality and showing them various justifications.

Yet, there is another problem here. Such disasters can appear bigger than they actually are (as said before), and here deniers, as it was previously said, may have their point right to a certain degree. On the other hand, if disasters are mutually related, and if these relations aren't recognized, then this can cause even further man-made disasters.

A note on other ontological issues

Apart from the appearance/reality of MSD, there are other ontological issues that seem to be important for our understanding of them and our actions. For example, their categorization is a serious issue. Namely, disasters can simply occur at a time and place mutually unrelated, and our actions are different compared to situations in which they are causally related, in a way that dealing with less important first for an overall effect can produce more damage at the end, for an overall effect.

(9) Apart from the appearance/reality issue of MSDs, there are others, first of which is identification. A clear description of an MSD is quite important, as well as the mutual relations of its aspects.

For example, we think that fires and heavy rains are mutually excluded in principle, and in most cases they are. However, heavy rain can produce floods, and flash floods can cause fires in urban areas (e.g. in industrial facilities and similar). This works the other way around, as well.

Concerning the types of MSDs, we still don't have any useful distinction principle mostly due to the fact that either MSDs are of local or regional character (floods in

Western Europe, fires in the Mediterranean, earthquakes in Croatia, volcano eruptions in Italy, tornadoes in Kansas or in South Moravia, in the Czech Republic, earthquakes in Japan etc.), or that they are small in scale (e.g. wildfires in the Mediterranean are small compared to wildfires in Siberia etc.).

(10) The most important difference in the type of MSD elements or aspects is between natural and unnatural or man-made elements that compose an MSD. This may seem trivial, but experience shows that public dealing with dominantly natural MSDs and with dominantly man-made MSDs is often different due to various political factors, that can prevent effective management of a dominantly man-made MSD.

For example, an industrial or power plant incident is unnatural but can cause a natural disaster, and then we have a multiple simultaneous un/natural disaster of a specific type, which is different, if causation is opposite because dealing with the cause requires different, if not, opposite actions.

Among many other ontological issues important for our daily lives there is perhaps the issue of an MSD-whole and its parts or of an MSD-phenomenon and its aspects. The question is – is an MSD a whole composed of its parts, or rather a phenomenon as a bundle consisting of many aspects?

(11) It seems that an MSD (multiple simultaneous un/natural disaster) in which particular disasters aren't causally connected can be understood as a whole composed of parts (as a heap). Still there is a possibility of cumulative effect and that a multiple simultaneous un/natural disaster, in which particular disasters are causally connected, can be understood as a single phenomenon with its many disaster-aspects because there is an obvious probable cumulative effect that cannot be predicted if each disaster-aspect is taken individually and not as an aspect of a single disaster-phenomenon.

Statement (11) makes sense, perhaps not so much from the point of view of ontological reasoning, but it may make sense from the point of view of human actions previous to, during, and after an MSD. In short, under the ontological view of an MSD some basic concepts are not clear at all. Let us mention few of them which could be of practical importance to individuals, local communities, and global civilization and culture, and which aren't clear.

(11) It isn't clear where and when an MSD starts, how it proceeds, and ends (also which aspects of it belong to its appearance or perception, and which to its reality). It isn't clear when individual disasters composing an MSD simply overlap, and when they create a cumulative effect (no matter if the working principle is suggested).

(11.1) It isn't clear in which ways individual disasters composing an MSD are mutually related creating new and highly unpredictable consequences.

Temporal individuation of an MSD (11.1) seems to be very important because the affected population knows when it starts, under which conditions it proceeds, and when it ends (this is extremely important because the conditions under which an MSD will end have an important reassuring effect on the affected population, while the opposite can create long-term stress which is not natural to humans, and which can lead to further mental and physical problems; see Tucker, Czapla, 2021). An MSD can be composed of accidentally overlapped disasters in a region and period, but also of causally overlapped disasters. It seems that different overlaps are possible. Let us give a few examples of negative, positive, and mixed overlaps.

(11.2) A negative overlap that cumulates a bigger MSD is an earthquake that produces its own direct consequences on infrastructure, humanitarian crisis, and loss of lives (however, this is rare), but it can produce urban fires, industrial incidents, and a tsunami with which it overlaps and further on produces a relocation of people. A positive overlap that produces a smaller MSD is a wildfire and a heatwave overlapped with rainstorms which cause cooling of air and the rain puts out the fire. A mixed overlap is similar to the previous case in which, in an MSD during a fire, the rain puts out the fire, but it causes various types of floods, flash floods, urban floods, etc. which can have further consequences on infrastructure, industrial incidents, and humanitarian crisis.

Obviously, negative and mixed overlaps are the most dangerous because people often don't know how to act or they have contradictory beliefs. Further on, again obviously, a bigger number of negative and mixed overlaps seems to be more dangerous, not only because of the bigger lack of know-how but also because of the number of problems they create in the same space and time. However, a series of smaller MSDs can equally deplete the resources of a local community to the same extent as one big MSD. There are obviously numerous possibilities of overlaps, and it's not easy even to describe their general pattern. So, it doesn't seem reasonable to continue neither with epistemological nor with ontological aspects. It is sufficient if we succeeded in formulating the right questions.

Concluding remarks

Epistemological and ontological aspects of our understanding, concepts, reasoning, and actions concerning MSDs have been-discussed here. Two points seem worthy of note.

(12) Taking a phenomenon of an MSD as real, seems to be a prerequisite or rational thinking and acting, which then manifests our acceptance of the reality of an MSD. For one thing, the most of ontological and epistemological issues on MSDs explicated previously aren't settled at all. No one knows exactly what there is and

what there isn't, of what kind it is, and how its elements relate to each other. For one thing, it is very hard to individuate a single MSD, i.e. when and where it starts, how long it lasts, and when it ends (for example, an official end of global Covid-19 pandemic is important in its own right given various restrictions, but also important to chronic non-Covid patients, post-Covid stress, economy, private and public social life, etc.). Consequently, all other ontological questions with their practical implications don't make much sense before one answers these. The same goes for epistemological questions. No one knows exactly what kind of cultural/habitual and technical know-how is needed, globally speaking. For one thing, it depends on too many variables (like demography, geography, economy, education, technology, culture, etc.) in order to know them exactly and precisely. In this respect, this whole paper is only a speculation, and a series of questions that in the opinion of the present author need to be asked, no matter if at the moment we still don't have the answers. At least, by asking them, we conceivably can hope that we will become aware that these will be the most important questions of human survival in not so distant future.

(13) Taking MSDs seriously is another issue. Perhaps, if a series of MSDs hit highly populated urban areas (a state capitol perhaps), then an MSD will be taken seriously if not for anything else, then because of the humanitarian crisis beyond anything that we have experienced in our lifetimes. Such MSD will probably show unpreparedness of officials and of the population, especially in terms of understanding the reality of it and of know-how in it. New habits, customs, and eventually whole new forms and ways of life would have to be invented or reinvented and practiced if people want to survive. Now, what is the probability of such situations, and how fast and successful humans will adapt is beyond the scope of the present paper. It seems sufficient to recognize the necessity of a series of new know-how and forms of life under probable new circumstances.

In terms of the overall conclusion from what has been said previously said (propositions 1-13), it must be noted that no conclusion is possible because of various formal and informal reasons, some of which will be mentioned hereafter.

(14) To say, for instance, that humanity doesn't really understand MSDs would be wrong because there are hotspots in which the majority of the population understands an MSD when it hits. However, this goes only for small groups on hotspots which seem to be irrelevant on a global scale if MSDs continue to hit regions that are not known as "traditional" hotspots. Understanding would have to be transmitted from some to many and this is still not done. To say for instance that humanity doesn't really know how to act under an MSD would be wrong; again for the same reason which says that the population in hotspots has know-how in terms of habits and sometimes even in terms of technology. Again, this goes only for small regions, and given the probable rise of MSDs, this seems globally irrelevant if such know-how isn't transmitted globally.

People generally think that they understand an MSD simply as some kind of a combination or addition of various individual natural and unnatural disasters which are, being individual and local, *transparent* to them, and that they know how to act in terms of habits and in terms of technical solutions. However, the number of human casualties and devastation of urban and natural environment shows that the majority doesn't understand and doesn't have know-how. These were and perhaps are false beliefs.

It needs to be said that we don't understand, that we don't know, and that we need to understand and learn. We need to say that to ourselves in the first place, so that we become aware of our own ignorance. If an MSD rise continues, humanity will probably suffer circumstances that don't compare to anything in documented history because the last time such MSD had happened was too far in the Earth's *natural history*. If two or three mutually related continental or global MSDs hit Earth in a short period of time, this could show that we humans don't have the slightest clue what is going on and what we should do.

References

Balfour, D. (2021). *Longtermism: How Much Should We Care About the Far Future?* 1000-Word Philosophy. Retrieved October 20, 2021, from https://1000wordphilosophy.com/2021/09/17/longtermism/

Bambals, R. (2015). Human security: an analytical tool for disaster perception research. *Disaster Prevention and Management*, *24*(2), 150-165. https://doi.org/10.1108/DPM-06-2014-0106

Bernstein, M. & Pfefferbaum, B. (2018). Post-traumatic Growth as a Response to Natural Disasters in Children and Adolescents. *Current Psychiatry Reports*, *20*(5), 37. https://doi.org/10.1007/s11920-018-0900-4

Boers, N. (2021). Observation-based early-warning signals for a collapse of the Atlantic Meridional Overturning Circulation. *Nat. Clim. Chang*, *11*, 680–688. https://doi.org/10.1038/s41558-021-01097-4

Braun, S. (2021, August 6). *Europe is burning: Four explanations*. DW. https://www.dw.com/en/europe-is-burning-four-explanations/a-58771341?fbc lid=IwAR2M3HBT1qPeVAXCFSlvniouemYJgYzxJvtcZ7AuE4mGZgED5t6GWz3bSkQ

Brown, P., Daigneault, A. J., Tjernström, E., & Zou, W. (2018). Natural disasters, social protection, and risk perceptions. *World Development*, *104*, 310-325. https://doi.org/10.1016/j.worlddev.2017.12.002

Cassam, C. (2019) *Conspiracy Theories*, Cambridge: Polity Press.

Croatian Government. (2021, 16 September). *80% of deceased were not vaccinated, COVID certificates in health institutions are a reasonable way to go*. Government

of the Republic of Croatia. https://vlada.gov.hr/news/80-of-deceased-were-not-vaccinated-covid-certificates-in-health-institutions-are-a-reasonable-way-to-go/32961

Gluhak, A. (1993). *Hrvatski etimološki rječnik* [*Croatian Etymological Dictionary*]. August Cesarec.

Havenaar, J. M., de Wilde, E. J., van den Bout, J., Drottz-Sjöberg, B. M., & van den Brink, W. (2003). Perception of risk and subjective health among victims of the Chernobyl disaster. *Social Science & Medicine*, *56*(3), 569-572. https://doi.org/10.1016/S0277-9536(02)00062-X

Index (HINA). (2021). *Vjetrovi razbuktali požare kod Atene. Premijer: Ako sumnjate u promjenu klime, dođite [Winds ignited fires near Athens. Prime Minister: If you suspect climate change, come]* https://www.index.hr/vijesti/clanak/vjetrovi-razbuktali-pozare-kod-atene-premijer-ako-sumnjate-u-promjenu-klime-dodjite/2295441.aspx

Jones, L., & Tanner, T. (2017). 'Subjective resilience': using perceptions to quantify household resilience to climate extremes and disasters. *Reg Environ Change*, *17*, 229–243. https://doi.org/10.1007/s10113-016-0995-2

Kahn, H. C. (2001). *The art and thought of Heraclitus*. Cambridge University Press.

Kirk, G. S. (1954). *Heraclitus: The Cosmic Fragments*. Cambridge University Press.

Kirk, G. S., & Raven, J. E. (1957). *The Pre-Socratic Philosophers*. Cambridge University Press.

Krkač, K., Lukin, J., & Mladić, D. (2013). Know-how I: Wittgenstein and practical certainty. In D. Moyal-Sharrock, V. A. Munz, & A. Coliva (Eds.), *Mind, Language, and Action, Papers of 36th International Ludwig Wittgenstein Symposium* (pp. 222-224). Austrian Ludwig Wittgenstein Society.

Krkač, K. (2022). Un/natural Disasters: Philosophy of Multiple Simultaneous Un/natural Disasters. In D. Crowther, & S. Sheifi (Eds.), *The Equal Pillars of Sustainability*, Series Developments in Corporate Governance and Responsibility Volume 17 (pp. 241-255). Emerald Publishing Limited. https://doi.org/10.1108/S2043-052320220000017012

Kyne, D., Cisneros, L., Delacruz, J., Lopez, B., & Madrid, C. (2020). Empirical evaluation of disaster preparedness for hurricanes in the Rio Grande Valley. *Progress in Disaster Science*, *5*, p. 100061. https://doi.org/10.1016/j.pdisas.2019.100061

Mayer, B. (2019). A Review of the Literature on Community Resilience and Disaster Recovery. *Current Environmental Health Reports*, *6*, 167–173. https://doi.org/10.1007/s40572-019-00239-3

McIntyre, L. (2021). *How to Talk to a Science Denier*. MIT Press. https://doi.org/10.7551/mitpress/13918.001.0001

Miceli, R., Sotgiu, I., & Settanni, M. (2008). Disaster preparedness and perception of flood risk: A study in an alpine valley in Italy. *Journal of Environmental Psychology*, *28*(2), 164-173. https://doi.org/10.1016/j.jenvp.2007.10.006

Millgram, E. (2000). Practical Reason and the Structure of Actions. In E. N. Zalta (ed.), *The Stanford Encyclopedia of Philosophy* (Winter 2020 Edition). https://plato.stanford.edu/archives/win2020/entries/practical-reason-action/

Nelson, M. C., & Rogers, J. (1992). The right to die? Anti-vaccination activity and the 1874 smallpox epidemic in Stockholm. *Social History of Medicine*, *5*(3), 369–88. https://doi.org/10.1093/shm/5.3.369

O'Connor, T., & Sandis, C. (2010). *A Companion to the Philosophy of Action*. Blackwell.

Robinson, T. M. (2003). *Heraclitus, Fragments, A Text and Translation with a Commentary*. University of Toronto Press. https://doi.org/10.1002/9781444323528

Shermer, M. (2014, September 1). *How the Survivor Bias Distorts Reality*. Scientific American. https://www.scientificamerican.com/article/how-the-survivor-bias-distorts-reality/

Smith, G. (2014). *Standard Deviations*. Duckworth Overlook.

Torres, P. (2017). *Morality, foresight, and human flourishing: an introduction to existential risks*. Pitchstone Publishing.

Torres, P. (2021, October 19). *Against longtermism*. AEON. https://aeon.co/essays/why-longtermism-is-the-worlds-most-dangerous-secular-credo?utm_source=rss-feed&fbclid=IwAR0GZJ7RmFaYFbZhmMB0Gn_UuWg6909Q0r2n_Q7h39M5VynT6ybELXdP8Yc

Tucker, P., & Czapla, C. S. (2021). Post-COVID Stress Disorder: Another Emerging Consequence of the Global Pandemic. *Psychiatric Times*, *38*(1), https://www.psychiatrictimes.com/view/post-covid-stress-disorder-emerging-consequence-global-pandemic

Wallace, R. J. (2000). Practical Reason. In E. N. Zalta (Ed.), *The Stanford Encyclopedia of Philosophy* (Spring 2020 Edition). https://plato.stanford.edu/archives/spr2020/entries/practical-reason/

Westerman, D., Spence, P. R., & Lachlan, K. A. (2009). Telepresence and the Exemplification Effects of Disaster News. *Communication Studies*, *60*(5), 542-557. https://doi.org/10.1080/10510970903260376

Wojtyla, K. (1969). *The Acting Person*. D. Reidel Publishing Company.

Ne/prirodne katastrofe II: Epistemologija i ontologija višestrukih istovremenih ne/prirodnih katastrofa

Sažetak

U ovom radu autor nastavlja razvijati filozofiju *višestrukih istovremenih ne/prirodnih katastrofa* (MSD) u smislu daljnjeg razvoja epistemologije know-howa, te ontologije pojavnosti/stvarnosti takvih katastrofa ponajviše u svjetlu globalno relevantnih katastrofa tijekom 2021., odnosno poplava u središnjoj Kini te u Njemačkoj i Belgiji, šumskih požara u Sibiru itd. Ovaj rad je nastavak istraživanja iz inicijalnog rada „Ne/prirodne katastrofe, filozofija višestrukih istovremenih ne/prirodnih katastrofa" (Krkač, 2022.) koji se tiče filozofije višestrukih istovremenih ne/prirodnih katastrofa (MSD) tijekom 2020. godine, ponajviše u Hrvatskoj u globalnom kontekstu. Glavna pitanja u ovom tekstu su epistemologija i ontologija višestrukih istovremenih ne/prirodnih katastrofa u smislu razlikovanja znanja i izgleda-stvarnosti. Oni su analizirani u konceptualno-morfološkom smislu čiji je cilj postizanje jasnih koncepata znanja i stvarnosti MSD-a i za koje se čini da su relevantni za naše razumijevanje MSD-a, odlučivanja i djelovanja prije, za vrijeme i nakon njih. Kritični rezultat se odnosi na činjenicu da postoji malo razumijevanja i spremnosti za MSD-ove globalno gledano i u prosjeku, izvan globalnih žarišta MSD-a, te izvan posebnih službi opremljenih i osposobljenih za djelovanje prije, tijekom i nakon MSD-a. Čini se da je ovaj opći nedostatak evidentan, a njegov najjasniji dokaz su višestruke istovremene ne/prirodne katastrofe (MSD) u razdoblju između 2020. i 2022.

Ključne riječi: ne/prirodne katastrofe, višestruke istovremene katastrofe, epistemologija, ontologija