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The 536 Dust Veil Event and the Long 6th Century

When Bo Gräslund (2008) argued that the reality behind the Fimbulwinter myth was two years without summer in the late 530s, climate and weather were once again blamed for radical societal changes by several authors. I argue that disasters are social phenomena, and that we must accept the agency of individuals and the resilience of societies, as well as the influence of climate and weather. This is an approach that I demonstrate demands both diachronic and synchronous studies with high chronological and spatial resolution. Further, a long-term view is necessary to separate effects of societal change, rooted in pre-536 society, economic fluctuation and geopolitical change in Europe, from effects of the Dust Veil Event. The dating of the archaeological inventory is not accurate enough to relate material change to a single calendar year (such as AD 536).

The 536 Dust Veil Event and the long 6th century

In the early 1980s, an atmospheric anomaly – the dry fog in the Mediterranean AD 536–541 gained attention from Richard Stothers and Michael Rampino (1983). Their influential study demonstrated that the fog caused a cold period and subsequent crop failure and hunger. In the 1990s, a few archaeologists highlighted the impact the event had on at least some aspects of Scandinavian societies (Randsborg 1997; Axboe 1999). This represented a radical break with the main tendencies in archaeological research of the 1990s, when human agency was considered the driving force for societal change (Näsman 2012:5). The breakthrough of what was dubbed *The Dust Veil Event* came when Bo Gräslund (2008) suggested that two years with low temperatures and lack of sunlight represented the reality behind the Fimbulwinter myth. Together with advancements in climate reconstruction (Buntgen et al. 2016; Toohey et al. 2016) his work inspired an abundance of works where The Dust Veil Event was considered either a prime mover for mid-6th century change, or an event with consequences that needed exploration (i.e. Zachrisson 2011; Bondeson and Bondesson 2012; Löwenborg 2012; Arrhenius 2013; Iversen 2013; Tvaari 2014; Zachrisson 2017; Solheim and Iversen 2019). In some of these works, The Dust Veil Event was the framework for analysis as well as the explanation of change (Moreland 2018). Scandinavian studies of the Dust Veil Event are in many ways a crash course in paradigmatic thinking. Thomas Kuhn (1962:x) defines scientific paradigms as “universally recognized scientific achievements that, for a time, provide model problems and solutions for a community of practitioners”. Gräslund’s influential work made it acceptable, and soon mainstream, to blame the climate and weather, which were now perceived as agents capable of causing societal change (Ingold and Terhi 2000; Strang 2005). This was hardly Gräslund’s intention. Even if he (along with Neil Price) argued “that the dust veil really happened and does seem to have had a very considerable socio-cultural impact” he also underlined that “we are not arguing that the late Iron Age cultures of the North were destroyed by the volcano” (Gräslund and Price 2015:440). So far, there seems to have been more enthusiasm for the former than the latter part of Gräslund and Price’s message (as highlighted by Moreland 2018 and Gundersen 2019).

Due to several critical voices (i.e. Moreland 2018; Gundersen 2019), the tide is now about to turn, as I will demonstrate. Without doubt the low summer temperatures of the late 530s caused a couple of bad years and hunger in the agricultural society of Scandinavia. The challenge is to understand how much and in which way this external cause affected a dynamic and complex society already accustomed to challenging agricultural conditions and intertwined in external relationships, as pointed out by Ingar Gundersen (2019). I will accept the challenge and advocate an approach that considers the impact of natural disasters alongside human agency, thus avoiding the mono-causal approach and

honouring the hitherto less noticed part of Gräslund's message. Furthermore, I explore how such a perspective helps separate the immediate effects of natural disasters from long-term societal trends in a specific, historical setting. But first I will present the current critical comments that inspired my search for a new approach to 6th century changes.

Challenging the paradigm: Critiques and anomalies

For some years now the Dust Veil seems to have been used, at least partly, to explain every 6th century change in Scandinavia, even though Gräslund (along with Neil Price) warned about such a simplistic interpretation (Gräslund and Price 2012; Price and Gräslund 2015:118, 127). A few critics, including Ulf Näsman (2012), raised their voices, but were mostly ignored by the many who were inspired by Gräslund. More recently, several researchers have pointed out anomalies; that is to say, datasets that do not work with the "536 Dust Veil Event"-paradigm. In some cases, changes in the archaeological record that occurred just after 536 are the result of long-term changes which started before 536, and on other occasions regional patterns are unseen or ignored (Gundersen 2019:112–114 with references). There is also critique of the climate data; although there is general agreement that there was a cold period (Helama et al. 2017). Some data suggest there were also temperature falls in the Pre-Roman Iron Age (500 BC–0) and the Roman Period (0–AD 400), and that the Early Iron Age (500 BC–AD 550) witnessed several cold summers (Sørensen et al. 2015; Nesje et al. 2016). Even the Dust Veil Event itself might have parallels in the Pre-Roman Iron Age (500 BC–0) (Stothers 2002; Baillie 2007). In recent years, these anomalies have caused a reaction, and several authors are critical to the paradigm (Høilund Nielsen 2015:38; Moreland 2018; Gundersen 2019; Gundersen et al. 2020). Critics have pointed out that "The 536 Dust Veil Event"-hypothesis is mono-causal, putting too much emphasis on natural forces and too little on societal forces, which is an echo of Näsman's (2012) critique. Critics have also pointed out that correlation in time is not the same as causation. In addition, critics have also pointed to the problem of relating dates for natural and cultural phenomena (Moreland 2018). Much of the archaeological record is chronologically dated, and Migration Period chronology is central to this issue. Siv Kristoffersen (2000:82–83) divided the Migration Period in two main chronological periods, D1 and D2, with D2 divided in D2a (AD 450/60–500) and D2b (AD 500–550). The periods are defined by relative typology, and even if researchers agree on the typology itself, the calendar dates may change in the future (Kristoffersen and Magnus 2015). This illustrates the problem of relating events dated to a calendar year and archaeological periods, or as formulated by Karen Høilund Nielsen (2015:25): "At present, however, it is impossible to determine whether this hoarding ceased gradually or whether it increased at the end

of the period [the late Germanic Iron Age (starting in the second quarter of the sixth century)]”. Some researchers suggest that future research may refine the chronology and possibly identify a transitional phase (Kristoffersen and Røstad 2020:25). Others clearly state a typological and technical change prior to AD 536 (Jørgensen 1999).

Even considering the problems with dating and causation, most opponents of the theory seem to accept that there really were a couple of bad years around c. AD 536–540, and also a longer cold period. Those in favour of the theory and those against it do agree that the Scandinavian archaeological record changed dramatically in the 6th century (Näsman 2012; Moreland 2018; Gundersen 2019). Burial customs, art styles, decoration, ornaments, technology and settlement patterns change, and military installations are abandoned. Even in general terms, the material culture changes. This mirrors radical changes in economy, property rights, ideology, daily life, cosmology, and political and military organization, and even the human identity (Kristoffersen 1995; Wiker 2001; Bergstøl 2008:186, 195–200; Kristoffersen and Oestigaard 2008; Østmo 2009; Hedeager 2011:61–62; Larsen 2013; Loftsgarden et al. 2013; Stene 2014:67; Ystgaard 2014:262–264; Bukkemoen 2016; Gjerpe 2017; Røstad 2018; Grønnesby 2019; Østmo 2019; Røstad 2021:262–268). However, researchers disagree on the nature, scale and cause of the changes. In some aspects, the discussion seems to follow the same lines as the discussion in the 1980s and 1990s of the possible Migration period crisis, where researchers could not agree whether the changes were caused by a collapse or a reorganization of society (Gjerpe 2017:195 with references; Gundersen 2019:102 with references). However, claims that the Dust Veil Event spawned a new era are as groundless as the suggestions that it did not affect people, as pointed out by Timothy Newfield (2018:468; also Price and Gräslund 2015:119). This leads to the fundamental question: *How* did the Dust Veil Event affect Scandinavian societies? Following on from this, we might add: What methodology can we use to explore such an intricate problem? In order to sort out these problems, the settlement of Eastern Norway will, in the following, serve as a case study. It is suggested that a new theoretical approach is necessary to bridge the gap – or at least reduce the distance – between the human-centred and nature-centred approaches (Widgren 2012), and that resilience theory could be just such a framework, since it inherently accepts the influence of nature as well as the agency of humans.

Resilience and disasters as social phenomena

In general, disasters are assessed by the extent to which they influence human life, health, property, economic activity, and other matters that concern us. Disasters are therefore social phenomena (Shimoyama 2002:20; Dominey-Howes 2018:7). Disasters may be defined as a “fundamental disruption in the social system (of

whatever size) that renders ineffective whatever patterns of social intercourse prevail” (Perry 2018:14). On the one hand, this anthropocentric view prevents the recognition of disasters’ effects on the non-human parts of the world. On the other hand, this definition makes it easier to accept that culture has a role in both producing and preventing disasters (Dominey-Howes 2018:7; Webb 2018:109–110). Human reactions to disasters are shaped by complex socio-ecological systems, and as different societies may act in diverse ways to crisis and stress, climatic change only results in disaster if societal circumstances allow (Butzer 2012; Butzer and Endfield 2012; Manning et al. 2017; Ebert 2018; Ljungqvist et al. 2018).

According to historians, egalitarian societies where a large proportion of the members had access to decision-making had a more adaptive resilience to climate-related disasters than polarized or hierarchical societies (Peregrine 2018:157). Or, as formulated by Daniel Curtis (2014:270): “Equality in the distribution of property and power was a vital component in pre-industrial societies’ capacity to deal or recover from crisis”. Resilience is the ability to survive and cope with a disaster (Cutter et al. 2008:600), and a measure of how well societies handle crisis and stress. Resilience theory aids our understanding of the causes of change in flexible societies, and the role of change in such societies (Redman 2005:72). Consequently, it helps in uniting human-centred and nature-centred explanations (Widgren 2012:1081; Fitzhugh et al. 2019). Resilient societies handle stress and crisis by changing and adapting to new conditions or simply by absorbing the shock (Redman 2005; Birkmann et al. 2010:72). Therefore, at least two distinct forms of societal resilience may be identified (Peregrine 2018, 2020). Adaptive resilience is the ability of a society “to successfully avoid crossing into an undesirable system regime, or to succeed in crossing back into a desirable one” after a disaster (Walker et al. 2004). Finland in the 6th century may serve as an example. Scientific data provide evidence of low temperatures in this period. However, in parts of Finland the archaeological record does not signal a change in the 6th century, even though the neighbouring areas were highly influenced by the Dust Veil Event (Tvauri 2014:40). The economy was based largely on hunting and fishing, rather than agriculture, and this probably made the society more resilient to low temperatures and “years without summers”, when compared to the neighbouring agriculturally dependant areas. In contrast, transformative resilience is the ability “to create a fundamentally new system” after a disaster (Walker et al. 2004). The social changes described by Daniel Löwenborg (2012) in Västermanland, part of the Mälaren valley, in central Sweden, may illustrate this. He points out how a group, which he calls a *kleptocracy*, used the shock, chaos, and power vacuum after the Dust Veil Event to radically change the society, including establishing their own rights to the valuable farmland.

Having established that disaster is a social phenomenon, as much a result of societal, political, economic and cultural qualities of the stricken society as of the

cause itself, it is then necessary to understand the society hit by the Dust Veil Event. While scientific data and historic documents date the event to 536 and subsequent years, archaeology generally has a coarser chronological resolution. The majority of archaeological dates are given in decades, rather than individual years. To examine the potential effect of a 6th century episode, such as the Dust Veil Event, a long-term perspective is required (Näsman 1998:255). 5th to 7th century Scandinavian society was self-sufficient in agricultural and every-day products, whilst this was an integrated part of the European economy at same time. Consequently, it is hard to grasp societal change in South-East Norway without considering the wider geopolitical situation and human agency alongside the effects of a colder climate.

The archaeological record, the *Dust Veil Event* and causality

Even if the changes from c. 500 to c. 600 are distinct, it is important to remember that most societies will inevitably change during a hundred-year period. Moreover, studies from Norway and Sweden demonstrate the need to consider regionality, change over time, and the social origin of change, as well as the Dust Veil Event as prime movers in society – as argued by Gräslund (and Price 2012). A highly detailed study of the settlements in two areas in Southern Sweden by Katalin Schmidt Sabo and Bengt Söderberg (2019:14, fig. 4, 5) exposes two different patterns. In the Lund area, there is a marked decline in the number of settlements between 525 and 550; as one would expect after the Dust Veil Event. However, there is a small decline from 475 to 525 as well, suggesting that the Dust Veil Event was not the single cause of the decline, but merely accelerated an ongoing change. On the other hand, in the nearby Malmö area, the number of settlements actually rises between 525 and 550. Further, there is a decline in the number of settlements between 475 and 500, and this decline is about the same size as the decline coinciding with the Dust Veil Event in Lund. There are also other differences between the two areas. In the Lund area, aristocratic residences, present throughout the studied Iron Age period, indicating a more hierarchical society than in the Malmö area, which had no such residences.

It is thus possible that the more egalitarian Malmö-society had a greater degree of resilience and did not allow a social disaster to occur, according to Peter H. Peregrine (2018:157). The study demonstrates both the value of synchronic studies with high chronological and spatial resolution, as well as the problems related to generalisations and simplifications.

Similarly, a study of cooking pits by Gundersen *et al.* (2020) illustrates the importance of diachronic studies with high chronological and spatial resolution. In all likelihood, cooking pits were predominantly pit ovens for cooking (meat), although other areas of utilisation are suggested (Gustafson 2005b, 2005c; Heibreen

2005; Langsted 2005; Risbøl 2005). They occur in various contexts, such as at settlements or in uncultivated areas. They sometimes occur in large clusters away from settlements, which are interpreted as specialized cooking pit sites (Gustafson 2005a; Martens 2005; Petersson 2006). Most agree that specialized cooking pit sites were important gathering places, even if authors dispute whether they are religious, political, or judicial in character (Narmo 1996; Gjerpe 2001; Ødegaard 2019). As cooking pit sites are outdoor gathering places, away from the settlement, they are perhaps a rather egalitarian gathering place (Gjerpe 2001), as opposed to the later hall where the ruling couple entertained (Herschend 1997; Løken 2001). Cooking pits in Norway generally occur from c. 500 BC to c. AD 550, although some are earlier, and later examples are known (Gjerpe 2008; Baar-Dahl 2012; Bukkemoen 2016; Gundersen et al. 2020). The end of the cooking pit tradition in Eastern Norway around c. AD 550 is seen by some as both evidence for the Dust Veil Event, and as an example of how society became more hierarchical in the aftermath of it (Gundersen et al. 2020: with references). However, a recent study of cooking pits from different areas of Eastern Norway challenges this assumption. A Kernel Density (KDE) plot of ^{14}C dates from cooking pits located in inner Eastern Norway demonstrates a slow decline from c. AD 300 to 550 (Gundersen et al. 2020: fig. 9.2). On the other hand, the SUM curve of the ^{14}C dates, demonstrates a sharp decline around AD 500–550; just as one would expect after the Dust Veil Event. However, corresponding curves from the coastal area of Vestfold in Eastern Norway, demonstrate a different pattern. The KDE and the SUM curve suggest that the use of cooking pits gradually fades from the second century AD, and the potential effects from the Dust Veil Event are hardly visible (Gundersen et al. 2020:191). As the cooking pit tradition in Vestfold ended before AD 536, the termination cannot mirror a demographic crisis or societal change caused by the Dust Veil Event. Preparation and serving of food and eating are deeply rooted in society and was probably also a political tool (Bukkemoen 2016). As Scandinavia underwent several noticeable changes in the Roman Iron Age and Migration Period, including political, economic and cosmological transformations, it seems likely that human agency caused the change in food practices (Herschend 2009; Hedeager 2011; Gjerpe 2017). Most likely, the cooking pits in Vestfold became redundant or irrelevant as the society became increasingly hierarchical. It is likely that the same process took place in Inner Eastern Norway as well, just later. Eastern Norway is often regarded as one region, but studies suggest new influences from the Roman Iron Age came along the west coast of Sweden, and then spread around the Oslo fjord region, eventually reaching Inner Eastern Norway (i.e. Rødsrud 2012; Skogstrand 2016; Gjerpe 2017). This pattern seems to apply to the cooking pits as well, and demonstrates the importance of understanding long-term trends and local developments.

The study of the pottery traditions in Migration Period Norway by Per Ditlef Fredriksen et al. (2014) may illustrate how changes that seemingly coincide with the Dust Veil Event are rooted in earlier societal change. Bucket-shaped pots – ceramic containers with a distinct mode of production – were made in Western Norway in the 4th century AD. The pottery type disappeared from the archaeological inventory AD 500–550, seemingly synchronous with the Dust Veil Event. However, both the societal meaning of the pottery and production mode changed c. AD 475, after which the production of bucket-shaped pottery moved from farming households to workshops controlled by an elite (Fredriksen et al. 2014:124). In that process, the tie between teacher and apprentice was cut, and eventually the production faded away (Fredriksen et al. 2014:126). Accordingly, the end of the use of bucket-shaped pots was initiated by an ideologically motivated change in production prior to the Dust Veil Event, not by a population decline following the said event. This underlines that human agency was as equally important as climate agency. Per Ditlef Fredriksen (2006) has suggested that the change in production mode c. AD 475 should be understood in light of the political and ideological changes in North Europe. The idea that a political change in Southern Scandinavia or Northern Continental Europe should influence the production of a local type of pottery in Western Norway is thought-provoking. Could other changes on the continent, such as geopolitical changes, affect Scandinavian society?

European geopolitics and changes in Eastern Norway

Even though the Romans did not directly interfere with policy, the Roman Empire influenced the economical and ideological sphere of Scandinavia (Hodges and Whitehouse 1989:79; Halsall 2009:129–130, 411–413; Herschend 2009; Grønnesby 2019). Although written sources from the continent sporadically mention contact with people from the far north, knowledge of Scandinavian-Roman connections and its effect on the Scandinavian society largely spring from interpretations of the archaeological record (Näsman 1998:258, 261). Therefore, a long-term view is necessary, as argued above. The direct contact between Eastern Norway and Limes was probably limited. It is likely that a few people served in the Roman army, and there were probably also a few people travelling on a more or less regular basis, but it is hard to argue that personal bonds between Limes and Eastern Norway were plentiful (Näsman 1998:260–262). Roman goods reaching Norway probably arrived through a Danish filter (Lund Hansen 1987:261–262). Therefore, the kind of goods that reached Eastern Norway is a result of both the economics and the politics of Denmark, the geopolitical situation on the Continent, and of course Norwegian society (Näsman 1998:270). The elite in Roman Iron Age and Migration Period Norway based their leadership upon personal alliances

and bonds, with gift-giving and imported luxury or prestige goods as central elements (Odner 1973; Myhre 1987:42–43; Kristoffersen 2000). The profound changes on the continent from c. 370 and the subsequent destruction of trade routes and personal networks must have influenced Scandinavia considerably (Hodges and Whitehouse 1989:89). Europe in the 4th to 6th century witnessed a long series of complex and confusing events. Within this, territorial control mattered more to the Romans than the Germanic or other tribes and nations that fluctuated between being enemies and allies of the Romans (Hedeager and Tvarnø 2001:163, 165). The Hun invasions of Europe at the end of the 4th century, among other things, pushed the Goths to the west and began a series of attacks and plundering on the Roman Empire – and of course the large migrations that eventually changed Europe forever. The changing geopolitical situation in Europe is in many ways reflected in the continental goods reaching Scandinavia (Näsman 1998; Randsborg 1998:82; Wickham 1998:280–281; Ljungqvist 2009). One example is the gold that was so plentiful in Migration period Scandinavia. Much of that gold probably originated from tributes or ransoms paid to the Huns from the Eastern Empire. The Huns then gifted it to friends and allies, and some of the gold probably found its way to Scandinavia. The payments stopped c. AD 450 (Hedeager and Tvarnø 2001:162), and the ceasing of the trickle of gold probably hit the upper level of the society quite hard and might be one of the reasons for the emergence of a new elite (Herschend 2009:380–381).

The highly symbolic plundering of Rome in AD 410 by the Vandals might symbolise the changing power situation in Europe and the downfall of the Roman economy. However, the Western Roman Empire was under constant pressure from its neighbours, and the economy regressed from the early 4th century on, with a brief revival in the mid to late 5th century (Hodges and Whitehouse 1989:52). The number of inhabitants in towns and cities, and the number and quality of new public buildings, declined from AD 300 onwards in parts of Europe, while in other areas such as the northern Italy, the process started c. AD 540 (Hedeager and Tvarnø 2001:235–238). Copper coins of small value are an indicator of the vigour of commerce, and these copper coins appear more rarely in the archaeological record in England and Gaul in the 5th century, Italy in the 6th, and Asia Minor in the 7th century. (Hedeager and Tvarnø 2001:241). As in the Scandinavian examples, the importance of regional and detailed studies is clear.

Two briefly presented examples demonstrate how geopolitical changes in North-Western Europe influenced the Scandinavian economy. At the end of the 5th and the beginning of the 6th century, the Franks dominated large parts of North-Western Europe, reaching from Spain to Denmark. However, control of the northern areas of this domain was disputed. The Thuringian kingdom was established just south of today's Denmark in the last half of the 5th century and controlled important travel and trade routes (Hedeager and Tvarnø 2001:170, 190;

Halsall 2009:392–395). The Frankish Empire was also vulnerable to attack from the sea, and indeed was attacked and plundered by the emerging Danish kingdom. However, in a raid on the Frisian coast c. AD 515–525, the Danish fleet was sunk, and the Danish king Chlochilaich/Hygelac was killed. This event probably either stalled or ended Danish coastal dominance. Moreover, the Thuringian kingdom was short-lived; the last ruler was killed by the Merovingians c. 531–534 (Halsall 2009:393). Thus, just a few years prior to AD 536, the Danes' lost their access to plundered wealth more or less at the same time as their overland neighbours were overtaken, with networks and trade routes probably destroyed in the process. The two events must have had serious consequences for the Danish economy, and probably for the economy in Eastern Norway as well. All in all, this superficial glance at the geopolitics of Europe and its influence on the Scandinavian economy and society, demonstrates the importance of considering alternatives to a mono-causal Dust Veil Event-hypothesis.

Twilight of the gods?

I have so far pointed out some of the changes to society in Eastern Norway that the Dust Veil Event did not cause, and societal causes for changes that correlate chronologically with the Dust Veil Event.

As I am not at all an Iron Age climate denier, I will also point out some changes it seems reasonable to tie to the Dust Veil Event. Conditions for cereal growing in Norway are marginal; just a centigrade lower average summer temperature may cause a bad year (Stamnes 2016). The consequences of the Dust Veil Event must have been grave. Recently, Trond Løken (2020:283–289) has argued that the abandonment of the village at Forsand, Rogaland, Norway was caused by the Dust Veil Event and the following wet climate, partly due to qualities of the local environment. It is possible that 6th century Scandinavia was hit by diseases as well, as a wetter and colder climate might favour *Claviceps purpurea*; a fungus which grows on grass plants (including cereals), and which causes ergotism and subsequently death among humans and farm animals. As ergotism also causes stillbirths, the combination of a bad year and ergotism might effectively kill the weakest living (in a physical, economic or social sense), and also the next generation (Bondeson and Bondesson 2014). The Justinian plague hit the Mediterranean in several waves between AD 541 and c. 750. The plague bacterium has recently been documented in North-Eastern Germany (Gutsmiedl-Schümann et al. 2018) and may well have reached Eastern Norway. Some suggest the plague killed as many as 60 per cent of the population in the Mediterranean, or 100 million people. However, these numbers are disputed, and some argue that the archaeological evidence does not support such massive death tolls, or indeed any real societal influence by the plague (Mordechai and Eisenberg 2019; Mordechai et al. 2019).

Even though diseases, food shortages and hunger caused by the Dust Veil Event should not be underestimated, there are still reasons to believe that the event did not cause all the changes that occurred in the 6th century. Large-scale research on human response to climate and natural disasters demonstrates some general, cross-cultural traits. Paola Giuliano and Nathan Nunn (2017) studied how the stability of temperatures AD 500–1900 affected the mentality of present-day populations. They “found consistent evidence that populations with ancestors who lived in more variable environments place less importance on tradition today and exhibit less cultural persistence” (Giuliano and Nunn 2017:46). Jeanet Sinding Bentzen (2019) has demonstrated how unpredictable and surprising earthquakes, tsunamis, and volcanic eruptions increase religiosity in present-day followers of poly- and monotheistic religions worldwide. In other words, if an unpredicted or unintelligible and unwanted natural event strikes, confused and scared victims may turn to religion. Religious coping may involve seeking a closer relationship with God(s) through prayer or other religious acts (Pargament 1997). Disasters may also change the way deities are imaged; after the Black Death Christ is no longer portrayed as victorious, but as a victim (Andrén 2014:181).

The Dust Veil Event must have been a shock, and increased religious devotion and willingness to abort traditions probably followed in its wake. Morten Axboe (2007:121) has argued that the increased depositions of gold in the late Migration Period and Early Merovingian Period is an attempt to placate the gods who punished people with bad years; a form of religious coping. He also points out that not all changes in the use of gold in the late part of the Migration Period were a result of the Dust Veil Event. Birgit Arrhenius (2013) has argued that the cult at Helgö was moved indoors after the years without summer, which may have been another way of intensifying the dialogue with the gods, or possibly a new kind of dialogue. In Sør-Fron, an area of inner Eastern Norway, burial practices in the Late Iron Age were a way to cope with the loss of soil caused by landslides (Sæbø 2020). Possibly the local burial practices changed from early to late Iron Age because the late Iron Age society, with individual ownership of land, reacted in a different way to the loss of soil when compared to the Early Iron Age society, where land was distributed in other ways. This underlines that different kinds of societies reacted differently to the same threat. Reno Fiedel et al (2011:168) has demonstrated that at the Stavnsager settlement, “sometime around circa AD 530”, the amount of used and discarded metal artefacts, including brooches with only small functional damages, increased dramatically. Even though Fiedel et al. suggest the phase could have started just before the Dust Veil Event, the dates are not precise enough to exclude that the practice could be a religious response to the Dust Veil Event. This change is also a demonstration of the importance of chronology; such conspicuous consumption could be interpreted as an anomaly if it happened before the Dust Veil Event, or as a demonstration of the impact

of the Dust Veil if it happened after AD 536. All in all, it seems plausible that the Dust Veil Event caused dramatic changes to mentality, ideology and religious practice, even if it did not cause society to collapse.

Burials in Eastern Norway

Burials are a material result of religious practice as well as a source for archaeologists to interpret the economic sphere (Härke 1997). I will briefly demonstrate that the declining numbers of burials from the Migration Period (AD 400–550) to the Merovingian period (AD 550–800) in Eastern Norway might mirror a change in burial practice just as well as the number of deceased.

Although there are regional variations, burials from the Migration Period are plentiful. On the other hand, burials from the Merovingian period are less numerous in Eastern Norway and the rest of Norway (Solberg 2000:135, 188). Burials from the 7th century are few, the mounds are mostly small, and there are few richly furnished graves (Gudesen 1980). In the course of the 7th century, the practice of richly furnished graves, called elite burials, clearly ceased in Eastern Norway (Gudesen 1980:128). This is possibly the result of population decline and economic depression in the wake of the Dust Veil Event. Still, huge investment in burials does continue. Raknehaugen is one of the few Eastern Norwegian burials with precise dates that connect it to the time of the Dust Veil Event. The mound is the largest in Scandinavia; 77 metres in diameter and 15 metres high. It was built with a timber core, and tree ring growth curves from the timber demonstrate at least one “year without summer” (Ording 1941). The timber is not dendrochronologically dated, but the ¹⁴C dates combined with the evidence for a “year without summer” suggest the mound was built c. 540 (Ording 1941; Skre 1997). Dagfinn Skre (1997:27) estimates that 30 to 60 persons worked for four months to cut and fetch the timber, after which 450 to 600 persons spent half a year building the mound; altogether, this makes 70.000–90.000 workdays. The impressive amount of work spent on the monument seems more like a collective religious coping, reflecting a society in shock which wants to placate angry gods, rather than a society hit by mass death. In contrast, next to none of the churches in Norway were built in the first 100 years after the Black Death, with its subsequent population decrease (Vreim 1947; Ekroll 1997:57–58).

Even if Raknehaugen stands out as an exception, there is circumstantial evidence of investment in burials concentrated in large mounds, rather than spread out over several smaller, well-equipped burials. The second largest burial mound in Norway, Jellhaugen in Østfold, might also have been built just after the Dust Veil Event, although the date is far more uncertain than the one from Raknehaugen (Stylegar and Norseng 2003:310). In Vestfold, four dated mounds are 45 metres or more in diameter, and two of these are dated to the 7th century, and none to

the early Iron Age (Gansum 1997: fig. 3). It also appears that in Sweden, the building of large mounds starts in the Migration Period, possibly after the Dust Veil Event (Ljungkvist and Hennius 2020). Thus, it seems that large mounds are a post-Dust Veil Event construction, and thus might be part of religious coping. The number of workdays spent on an “average” Iron Age burial monument in Vestfold and Østfold in Southern Norway varies from 10 to 82 (Løken 1987:61), and the work-days spent on Raknehaugen thus equals 1000 regular burials – or more! Even though the methods used to calculate the workdays may differ (Løken 1987:62; Skre 1998:319–320), the numbers nevertheless demonstrate that the public investment in monuments did not necessarily decrease, even if the number of monuments did. The decline in the numbers of burials, and the poorer grave goods, most likely reflect changes in burial practices rather than a population decline. It is hard to say if burial practices reflect a more hierarchical society (fewer are buried, the monument itself signals power and rich burial goods are not required), or a more egalitarian society (the monuments reflect religious coping, the buried are not necessary wealthy, and demonstrations of personal wealth are irrelevant). Regardless of this, the burial practices signal change as much as decline, and this point is important as I explore the long-term settlement pattern of Eastern Norway.

Settlement in Eastern Norway

The number of excavated settlements in Eastern Norway from the Migration period (AD 400–550) are plentiful compared to the numbers of late Iron Age (Migration Period AD 550–800 and Viking Age AD 800–1050) settlements (Gjerpe 2016; Eriksen 2019). On the other hand, the number of burials demonstrates that there was a relatively large population in the Viking Age (Solberg 2000). The low number of known settlements from the late Iron Age is probably due to a mix of settlement pattern, house construction, and the activity of archaeologists – and possibly also a real decrease in the numbers of farms, at least in the Merovingian Period (Gjerpe 2017). Just as chronological problems make precise dating of objects and burials challenging, the form of the ¹⁴C calibration curve in this period often makes the dating of settlements a bit vague. Much of the Migration Period settlement in Eastern Norway is dated by ¹⁴C, and even if statistical methods help, the calibration curve is flat, which results in a wide calendar year probability span. And just as burial practises influence the number and characteristics of burials, the number of known settlements is a result of settlement structure and excavation practice (Gjerpe 2017:59–71). As with other 6th century changes, a long-term view is necessary to distinguish changes caused by the Dust Veil Event from societal change. Until AD 200, there were generally just a generation or two of houses at each settlement site in Eastern Norway, with the exception of Østfold. After a

few generations, or even just one generation of houses, the sites were abandoned and new farmsteads were established. In the next period, AD 200 to AD 600, farmsteads are still established and abandoned on a regular basis, but there was often activity at the sites themselves after abandonment. This suggests that some people tried to establish a right to land that was not in current use – the first attempt to establish property rights. At two different sites in Vestfold, a burial dated to the Merovingian period has been placed in the central aisle of an older house. These burials probably marked rights to land that was not in use, and are thus a sign of emerging property rights (Gjerpe 2017).

The number of excavated settlements declines sharply from the late Migration Period (400–550) to the Merovingian Period (550–800). Researchers seem to interpret the pattern in two differing ways. Some interpret it as a crisis and dramatic population decline, probably a result of the Dust Veil Event. Others interpret it as a restructuring of the settlement following societal change. As most Early Iron Age farmsteads were used only for a few generations and then abandoned, the big question is not why the settlements were abandoned, but why archaeologists do not find the settlements from Late Iron Age.

Both the building technique and settlement pattern change in the Late Iron Age and the subsequent Early Medieval period in Norway. In the Viking Age, three-aisled buildings with dug-down posts are probably replaced by corner-timbered log houses or other building types without elements that involved digging. More or less at the same time, most farmsteads made one final move, after which the settlement pattern familiar from later periods was established. The new feature in this settlement pattern is that they do not move on after a few generations. Most Iron Age settlements in Norway are located by mechanical topsoil stripping in cultivated land, initiated by rescue/development-initiated excavations. In such conditions, the only building elements that are found are those that are dug so deep into the subsoil that parts of them survive ploughing. In addition, farmyards in use today are largely avoided by developers, and excavations are rarely conducted in such locations. On the occasions where excavations are carried out, the activity seems to start c. AD 600, but few Iron Age buildings are identified (Stene 2009; Grønnesby 2013; Grønnesby and Heen-Pettersen 2015). This source-critical circumstance results in at least two situations where buildings are not found. The corner-timbered log buildings leave little or no trace in cultivated land, although metal detecting finds may indicate the settlement location. Settlements positioned in the same place as historically known farmsteads are not identified either, partly because later activity removes evidence of Late Iron Age buildings, and partly because such areas are rarely excavated. In addition, a more hierarchical society and larger farms, or more labour-consuming production modes, may have resulted in larger numbers of residents at each farm, reducing the number of farms even if the number of inhabitants did not decrease.

Dust Veils and societal change

Even though I have pointed out some problematic aspects of the Dust Veil Event paradigm, I am not an Iron Age climate sceptic or denier. I do accept that the 536 Dust Veil Event happened, and that it resulted in a severe fall in summer temperatures in Scandinavia for a few years, as a prelude to the Late Antique Little Ice Age. Also, I do not doubt that years without summer must have resulted in tough years, a lack of agricultural products, and subsequently famine. Further, I do accept that the Dust Veil Event was a shock beyond human control to individuals as well as systems. Still, as I have argued, the Dust Veil Event did not cause all changes in the 6th century. In my understanding, several of the 6th century changes are as much a result of geopolitics and human agency, including long-term social processes, as they are an inevitable consequence of the Dust Veil event. As disasters are social, different kinds of societies are resilient in diverse ways, and to avoid mono-causal explanations or exaggerating consequences, it is necessary to (re)consider the scale of the impact the Dust Veil Event had on separate spheres like economy, polity, and cosmology. The 536–541-event must be studied in a wider context and longer time span. Firstly, because the precision of archaeological dates rarely allows the study of an event to be narrowed down to a few calendar years, and secondly because this makes it possible to distinguish societal changes caused by long-term trends from those caused by short-term changes triggered by environmental shock. As I have argued, the Dust Veil Event caused disruption of the patterns of social intercourse and should be considered a disaster. However, Eastern Norwegian society was also resilient. Everyday life, such as agricultural praxis, probably did not change much for those who survived. On the other hand, land ownership and the cosmological and political sphere did change, but as much a result of long-term processes as the Dust Veil Event itself.

One way to discriminate between the effects of the Dust Veil Event and the effects of societal change is to answer the contra-factual question: what would the world be like without the Dust Veil Event? Any answer to that question would point out what the event did cause and help differentiate between correlation in time and causation (Sunstein 2016). According to Jon Elster (1978:177) historians “have been talking counterfactually all the time without knowing it”. Further, he (Elster 1978:178) argues that “in a non-experimental and non-comparative discipline one can hardly discuss the relative importance of causes without engaging in some kind of thought experiment where one removes successively and separately each of the causes in question and evaluates what difference the absence of this cause would have made to the phenomenon in question”. I suggest that a thoroughly considered and critical examination of counterfactuals may produce a deeper understanding of history, as it allows the exploration of causation and acceptance of the role of human agency (Kaye 2010; Sunstein 2016; for a critique, see Evans 2014). It is important to note that counterfactual history cannot be

based on false or wildly elaborate causal chains or totally unpredictable changes (Sunstein 2016:437). In other words, it may be productive to explore how the Second World War would have ended if Adolf Hitler was assassinated 20th of July 1944, i. e. such a study would deal with the importance of Hitlers persona. However, it would be rather unfruitful to explore how it would have ended if Superman turned Nazi and helped him out. Although I will not explore the full potential of the counterfactuals here, the approach helps to distinguish the effects of the Dust Veil Event from the effects of long-term societal trends and human agency.

For the sake of simplicity, my counterfactual analysis is limited to a quite simple question: what would the Scandinavian world have looked like if the death toll AD 536–540 was a normal one? For those who did not starve to death, and those who loved them, the answer is simply “better”. For the rest, the next generations – and for us living today – the question is harder to answer. Unfortunately, precise dating is just as necessary for counterfactual analysis as for traditional analysis, and a proper contrafactual analysis merits its own, larger study. However, it seems that extensive societal change would have happened anyway. The cooking pits had lost their relevance before the Dust Veil, indicating that a more hierarchical society was in the making. So, even if the end of the cooking pit tradition coincides with the Dust Veil Event, the link between the two is arbitrary, not causal – even if the population size was the same in 541 as in 535, people would not have made cooking pits. The disappearance of the bucket-shaped pots is a bit trickier. Even if the end of the use of bucket-shaped pots was initiated by an ideologically motivated change in production prior to the Dust Veil Event, it is possible a few dedicated artisans would have preserved the craftsmanship for a generation more, but eventually anachronisms die. At the same time, the stream of gold and luxury or prestige goods from the continent ended without the aid of the Dust Veil, creating problems for the elite. Conversely, the disaster opened people’s minds to new ideas, such as property rights and possibly actuated religion or cultic practice. Long-term trends in the Scandinavian society pointed towards a more hierarchical society, where some controlled land they did not use – the first steps of establishing property rights. I will thus maintain the idea that the Dust Veil Event opened people’s minds to new ideas and actuated prolonged societal changes, rather than caused them. Still, ideological trends from Southern Scandinavia and Northern Europe would probably have reached Southern Norway anyway.

Conclusion

Getting away from mono-causal explanations and understanding the changes in the 6th century is complicated. As disasters are social phenomena, we need to understand the societies hit by the Dust Veil Event as well as the event itself. In my opinion, the climate itself in the 530s is well-documented, but we need to understand how unique the event really was. Bad years with poor harvests must have been a fairly regular occurrence in the Iron Age, and evidence suggests that the Late Antique Little Ice Age was not the only cold period in (North) Scandinavia. We also need to understand the long-term trends in societal change. This requires us to accept and consider the historicity and diversity of Scandinavian societies as well as human agency. To separate the effects of the Dust Veil Event from the effects of long-term trends and human agency, a counterfactual analysis of causation might be useful. If one can figure out what Scandinavia would have looked like in 550 if the Dust Veil Event had not happened, one would also be able to sort out the effect of the *years without summer*. Such an approach demands diachronic studies with high chronological and spatial resolution, since general overviews or simplifications might lead the investigators to mistake the effects of long-term societal change and economic fluctuation for effects of the Dust Veil Event. Further, we must consider both the resilience and the vulnerability of the societies in question. To do this we must accept the agency of individuals as well as the resilience of societies. This requires synchronous studies of the societies hit by the Dust Veil Event with a high spatial resolution (i. e. Amundsen 2021; Berg 2021). As a conclusion, now that both the enthusiastic period where the Dust Veil Event was the sole cause of every change, and the first wave of critique is behind us, and new and detailed studies are underway, I will point to the next challenge: Make good use of detailed studies by accepting the complexity!

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Summary

In 2008, Bo Gräslund argued that the reality behind the Fimbulwinter myth involved two years without summer. He reintroduced ideas that were initially brought to notice by a few archaeologists in the late 1990s. This inspired an increase of studies where the *Dust Veil Event* served as the framework for analysis, as well as the explanation of change. Critics later pointed out that “The 536 Dust Veil Event’-hypothesis is mono-causal, placing too much emphasis on natural forces and too little on societal forces. Moreover, it was pointed out that correlation in time is not the same as causation. Although archaeologists generally agree that material culture and society changed in the 6th century, some have pointed out that not all changes correlate with the Dust Veil Event. Moreover, even some events that do correlate might be a result of long-term societal processes. Gräslund himself underlined that “we are not arguing that the late Iron Age cultures of the North were ‘destroyed by the volcano’”, and in this article I honour this hitherto less noticed part of Gräslund’s message.

I am not an Iron Age climate denier, the Late Antique Little Ice Age and the low temperatures in the 530s are well-documented, but we need to understand how unique the event really was. Bad years with poor harvests must have been fairly regular occurrences in the Iron Age, and evidence suggests that the Late Antique Little Ice Age was not the only cold period in (North) Scandinavia. To what degree, and in which way, did the Dust Veil Event affect a dynamic and complex society, a society which was intertwined in external relationships and accustomed to challenging agricultural conditions? And following this: what methodology can we use to explore such an intricate problem?

Egalitarian societies are likely to have a greater degree of resilience than more hierarchical societies, and different kinds of societies may handle the same incident in different ways. Disasters are social phenomena, as much a result of societal, political, economic and cultural qualities of the stricken society as of the cause itself. Consequently, it is necessary to understand the society hit by the Dust Veil Event, as well as the event itself. By studying disasters as social phenomena in the light of resilience theory, I separate the impact of nature from that of human agency. This requires us to accept and consider the historicity and diversity of Scandinavian societies. Such an approach demands synchronous and diachronic studies with high chronological and spatial resolution, since general overviews or simplifications might lead the investigators to mistake the effects of long-term societal change, geopolitical events or economic fluctuation for effects of the Dust Veil Event. Due to the nature of the archaeological record and the state of the current Migration period D2 chronology, a long-term view is necessary.

I accept that the Dust Veil Event caused tough years and hunger, but I argue that human agency in the form of geopolitics in Europe changed networks of trading and contacts, thereby cutting off the Eastern Norwegian elites from their

access to prestige goods, and undermining their power base. I also propose that the influence of the Dust Veil Event on the mentality of people was as important as the deaths it caused when it comes to the sixth century changes. One example is the decline in (rich) burials from the Migration period to the Merovingian period. This may reflect a change in ritual investment from many smaller burial mounds, well equipped with artefacts, to large mounds with limited grave goods, which in turn may mirror a form of collective religious coping rather than population decline. To separate the effects of the Dust Veil Event from the effects of long-term-trends and human agency, a counterfactual analysis of causation might be useful. If one can figure out what Scandinavia would have looked like in 550 if the Dust Veil Event had not happened, one would also be able to sort out the effect of the *years without summer*.