SETTLEMENT CHANGE ACROSS MEDIEVAL EUROPE

OLD PARADIGMS AND NEW VISTAS

edited by NIALL BRADY & CLAUDIA THEUNE

RURALIA XII

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Contents

The mid-6th century crises and their impacts on human activity and settlements in south-eastern Norway

*Steinar Solheim & Frode Iversen**

Abstract

AD 536 is a poignant date in European history and marks the advent of a series of documented environmental changes that affected societies across Europe in various ways. Sudden and severe climate deterioration led to vast crop failures and was followed by plague epidemics in the following decades. In this article, we examine the timing of the changes in human activity with a detailed investigation of 855 radiocarbon determinations from Vestfold, Norway. The modelled radiocarbon data show a decrease in activity concurrent with the climatic events and plague epidemics that took place in the mid-6th century, and provide another proxy for the significant changes that occurred during this time. The results may support the idea that *fimbulvetr* was the start of a long-lasting cooling period combined with severe population declines and a dramatic decrease in cultural activity. In the past and present, the investigated area represents a heartland of rural production and settlements in Scandinavia. The time span of the crises is fundamental to our academic understanding of the character and societal impacts of the crises, and this study examines it more precisely than previous work.

Keywords: *The Early Middle Ages, Scandinavia, Vestfold, the 536 event, settlement decline, summed radiocarbon dates.*

Résumé

Les crises du milieu du 6e siècle et leurs impacts sur l'activité humaine et les implantations dans le sud-est de la Norvège

536 est une date marquante dans l'histoire européenne et signale l'avènement d'une série de changements environnementaux documentés qui ont affecté les sociétés de diverses manières à travers toute l'Europe. La détérioration soudaine et sévère du climat a conduit à de mauvaises récoltes et a été suivie par des épidémies de peste dans les décennies suivantes. Dans cet article, nous examinons le rythme des changements dans l'activité humaine à partir d'une étude détaillée de 855 datations radiocarbone issue du site de Vestfold, en Norvège. Les données modélisées sur le radiocarbone montrent une diminution de l'activité concomitante aux événements climatiques et aux épidémies de

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peste survenus au milieu du 6e siècle et fournissent une autre alternative au sujet des changements importants survenus pendant cette période. Les résultats permettent d'avancer l'idée que *fimbulvetr* a été le début d'une période de refroidissement de longue durée combinée à de graves déclins de population et une diminution spectaculaire de l'activité culturelle agricole ?. Autrefois et actuellement, la zone étudiée correspond à un centre de la production rurale et à des établissements. La durée des crises est fondamentale pour notre compréhension académique du caractère et des impacts sociétaux des crises, et cette étude l'examine plus précisément que les travaux précédents.

Mots clés: *haut Moyen Âge, Scandinavie, Vestfold, l'événement de 536, le déclin de l'habitat, la somme de datations au radiocarbone.*

Zusammenfassung

Die Krisen des mittleren 6. Jahrhunderts und ihre Auswirkungen auf menschliche Aktivitäten und Siedlungen in Südost-Norwegen

Das Jahr 536 ist ein bedeutendes Datum in der europäischen Geschichte und markiert den Beginn einer Reihe von dokumentierten Umweltveränderungen, die die Gesellschaften in ganz Europa auf unterschiedliche Weise betrafen. Plötzliche und starke Klimaverschlechterungen führten zu großen Ernteausfällen, in den folgenden Jahrzehnten schlossen sich Pestepidemien an. In diesem Artikel untersuchen wir den Zeitpunkt der Veränderungen der menschlichen Aktivitäten mit einer detaillierten Analyse von 855 Radiokarbondaten aus Vestfold, Norwegen. Die modellierten Radiocarbon-Daten zeigen einen Aktivitätsrückgang in Verbindung mit den klimatischen Ereignissen und Pestepidemien, die in der Mitte des 6. Jahrhunderts stattfanden und geben einen weiteren Hinweis auf die signifikanten Veränderungen, die während dieser Zeit stattfanden. Die Ergebnisse könnten die Idee unterstützen, dass *fimbulvetr* der Beginn einer langanhaltenden Abkühlperiode in Verbindung mit einem starken Bevölkerungsrückgang und einem dramatischen Rückgang der kulturellen Aktivitäten war. In der Vergangenheit und Gegenwart ist das Untersuchungsgebiet Kern der ländlichen Produktion und Siedlungen in Skandinavien. Die Dauer der Krisen ist grundlegend für unser wissenschaftliches Verständnis des Charakters und der gesellschaftlichen Auswirkungen der Krisen. Diese Studie untersucht die Phänomene detaillierter als frühere Arbeiten.

Schlagwörter: *Frühmittelalter, Skandinavien, Vestfold, das Ereignis von 536, Siedlungsrückgang, Radiokarbondaten.*

Introduction

The 6th century was a turbulent period in Scandinavia and Europe. The archaeological and palaeoenvironmental record and written sources bear witness to the social turmoil, cultural collapse, and environmental oscillations of this period. In Scandinavia, a large-scale abandonment of farms and farmlands was recorded, and this has been linked to a severe demographic decline. Gräslund and Price (*2012*, 433) have suggested that the Scandinavian population was reduced by as much as 50% during the 6th century. In recent years, archaeologists have shown a strong interest in the dramatic event(s) that occurred in the years AD 536-537 and the following century, and several scholars have argued that the social turbulence and demographic shift were linked to contemporary climate change and plague epidemics (*e.g. Drake 2017*; *Gräslund – Price 2012*; *2015*; *Iversen 2016*; *Oppenheimer 2011*; *Tvauri 2014*). The effects of an event in AD 536-537, 'The Dust Veil', can be found in a series of fossilised tree rings that demonstrate that the temperatures during the summer months were remarkably cold in Scandinavia from AD 536 to AD 545 and in some places in the northern hemisphere from AD 536 to AD 550. While this event is recorded as an anomaly in the climate record (*e.g. Luterbacher et al. 2016*), climatologists have recently argued for the existence of 'The Late Antique Little Ice Age' (LALIA), an extended and spatially synchronised cooling that lasted from AD 536 to AD 660, following a cluster of large volcanic eruptions in AD 536, 540, and 547 (*Büntgen et al. 2016*; *McCormick et al. 2012*; *Sigl et al. 2015*; *Solomina et al. 2016*).

Although significant results about the crises in North Europe have been obtained on the basis of aDNA (*Hardbeck et al. 2013*), archaeological evidence (*Gräslund – Price 2012*; *Herschend 1988*; *Iversen 2016*; *Löwenborg 2012*; *Zachrisson 2011*), written sources (*Gräslund 2007*), archaeobotanical records (*Fredh et al. 2013*), climatic analyses of tree rings (*Büngten et al. 2016*), and speleothem records (*Lauritzen – Lundberg 1999*), many questions still remain unanswered. Was the mid-6th-century crisis caused only by sudden and severe climate events, or did the Justinian Plague also reach Northern Europe, as indicated by the study of Harbecks et al. of *Yersinia pestis* bacteria in skeletons from the 540s near Munich? Alternatively, and most likely, was the crisis caused by a combination of different factors? The issues under investigation include the identification of the effects of a decrease in human activity or populations, as

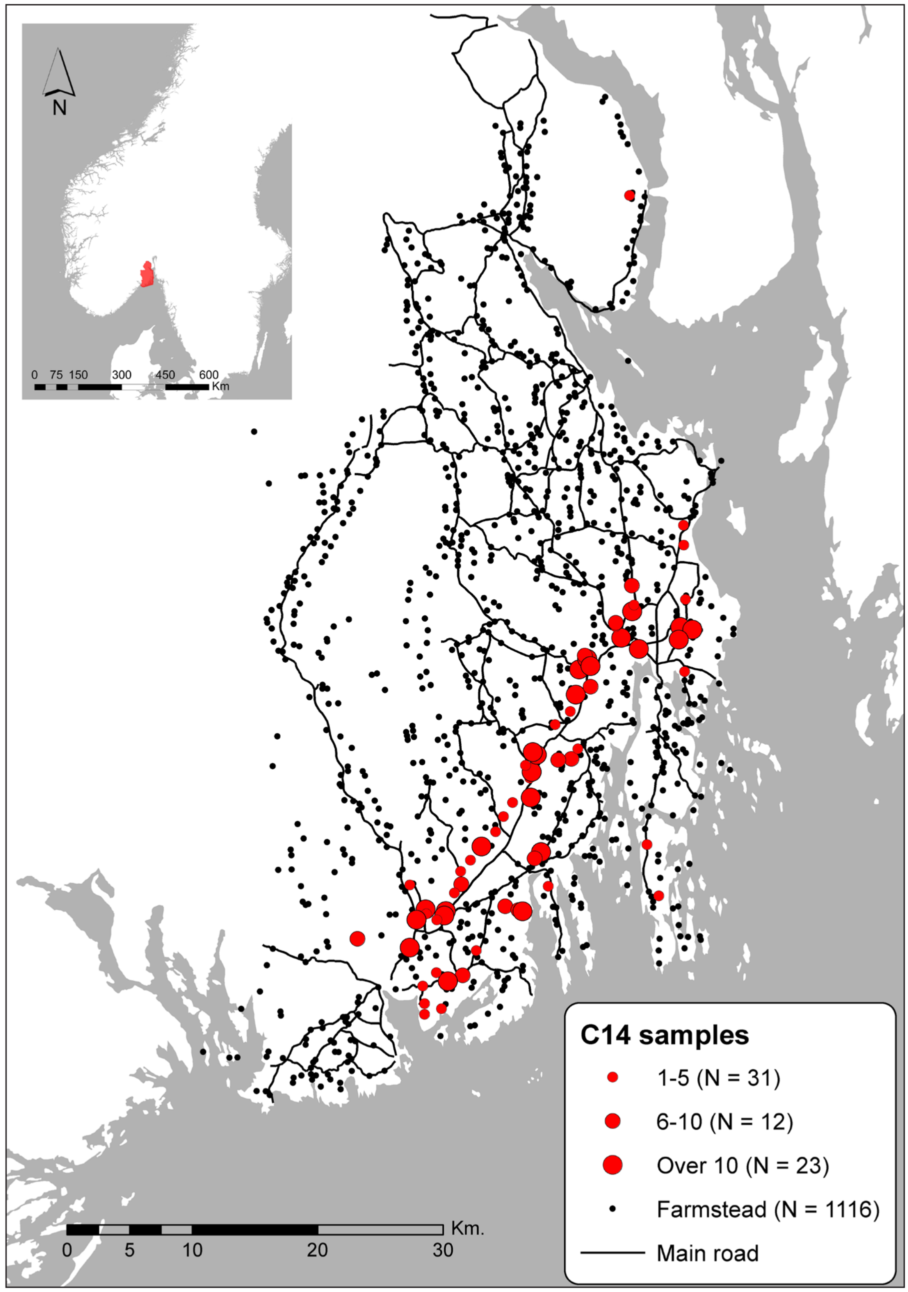

Fig. 1: Area of investigation. Vestfold, Norway. Medieval farmsteads and roads (recorded based on written sources ca. AD 1200-1500 and historical maps from 1832). The study includes 855 radiocarbon dates from 103 sites at 66 farms (marked in red) (© Frode Iversen and Steinar Solheim).

observed in the archaeological data from south-eastern Norway, and whether it relates to short- or long-term climatic changes or plague outbreaks.

This article does not describe the character of the climatic changes or the Justinian Plague, topics that have already been comprehensively studied. Here, we will use radiocarbon data as a proxy to investigate the demographic changes that occurred during the 6th century and provide a more detailed picture of the temporal development of south-eastern Norway than has previously been presented. Norwegian radiocarbon data have thus far not been included in studies of the crisis, and it is the explanatory potential of this dataset that will be explored in this paper. By investigating 855 radiocarbon determinations from 66 farms in Vestfold, Norway, in central Scandinavia, from the period of BC 2000 to AD 1500, with a focus on the period from AD 1 to AD 800, this paper seeks to clarify the initiation and duration of the recession and address topics related to human responses to changes and disasters (Fig. 1).

Background

Since the start of the 1990s, evidence of several hundred settlements and several thousand buildings has been identified in Scandinavia (*Edblom 2004*; *Göthberg 2007*; *Iversen 2013*; *Streiffert 2005*; *Söderberg 2005*). In south-eastern Norway, the growth in data from Iron Age agricultural settlements is largely due to several large-scale archaeological excavations in Vestfold and Østfold (*Bårdseth 2008*; *Gjerpe 2008*; *2013*). These data are steadily increasing, and due to major development activity and the building of infrastructure in areas of urban expansion, the Museum of Cultural History organises 50-70 excavation projects each year. A total of 50%-75% of all excavations involve topsoil stripping and the documentation of settlement structures such as houses, postholes, hearths, and cooking pits, as well as the documentation of graves in agricultural areas around the Oslo Fjord (Fig. 2). From these excavations, a large body of radiocarbon dating data has been accumulated since the early 1990s.

A large proportion of the investigated settlements had a more central location in the agricultural landscape than previously studied visible abandoned farms, which were situated outside the best agricultural areas (*Myhre 1972*; *Rønneseth 1966*). In terms of the abandonments, it is difficult to date the sites precisely, but it seems evident that settlement abandonment was more frequent during the Migration Period (AD 400-550) than any other prehistoric period (*Gräslund – Price 2015*; *Iversen 2013*; *Vetrhus 2017*). In south-eastern Norway, there was a dramatic decrease in the number of documented buildings during the Migration Period, especially the Merovingian periods, compared to those in the preceding Roman Iron Age (*Gjerpe 2016*; *Iversen 2013*). The abandonment of farms is tightly connected to shifts in cultural activity and possibly reductions in population sizes, and we also observe that the number of known burial finds in southern Norway was 90%-95% lower after AD 536-545 than before this period (*Solberg 2000*, 180-182, 197-198; *Vetrhus 2017*). To investigate the abandonment of farms and the general downturn in activity in the agricultural landscape, this study used radiocarbon date determinations as a proxy for relative temporal variations in human activity (*Shennan et al. 2013*).

The modelling of radiocarbon data is useful for a top-down approach investigating relative temporal variations in the intensity of human activity and its relation to different events or processes (*Shennan – Edinborough 2007*). The approach rests on the premise that temporal variations in human activity are reflected in the deposition of radiocarbon dates of anthropogenic origin (*Shennan et al. 2013*). In other words, it is assumed that there is a positive correlation between the number of people in a population and the number of dateable contexts they produce (such as sites, hearths, refuse pits, graves, and postholes). This approach uses the law of large numbers, which implies that large amounts of archaeological data can be used as a proxy for major historical trends, and the robustness of the model and the correlation between dates and historical events increases with the number of representative dates (*Edinborough 2015*, 196). We believe that this method can provide information about population dynamics, if there are sufficient observed samples of dated human activity. While this approach does not provide an exact replication of the demographic development, it reveals the underlying signal in human activity when the proper methodology is used (*Edinborough et al. 2017*, 12).

Some of the features of a summed radiocarbon probability distribution can appear to represent demographic events or correlate with major environmental or climatic events, when they are actually the consequence of sampling variations or related to calibration effects (*Michczyński – Michczyńska 2006*; *Shennan et al. 2013*; *Williams 2012*). Nevertheless, the approach has been widely used to study the impact of climatic events on population sizes and highlights interesting patterns for further discussion (*e.g. Armit et al. 2014*; *Tallavaara – Seppä 2011*).

As previously mentioned, we will not address the character of the events that occurred in the mid-6th century, but we firmly believe that the timing and span of the decline in human settlements and activity are crucial to the evaluation of the character and societal impact of the crisis. Our working hypothesis is that in the mid-6th century, a crisis comprising several different natural factors, such as volcanic eruptions, cooling events, and a plague, occurred, and this had a long-lasting impact on Iron Age societies. We argue that the timing of the social and cultural changes that occurred in this period can be better understood and studied in more detail through the use of radiocarbon data.

Methods

In this paper, we use 855 radiocarbon dates ranging from BC 2500 to AD 1600 from 103 archaeologically investigated sites in Vestfold, Norway, as a case study. This region has been thoroughly investigated during the last two decades by several large excavation projects, and we argue that the Iron Age activity in this region represents major trends in Scandinavia. The collected ^{14}C data comes from different contexts, such as farm buildings, including postholes (13% of all ^{14}C dates), burials (8%), cooking pits/hearths (36%), and cultivated layers, fields, and clearance cairns (9%), as well as a variety of other structures (*e.g.* pits, cultural layers, ditches, production places, roads) that occur regularly at archaeological sites in this region (33%). Only ^{14}C dates interpreted as related to anthropogenic activity are included in the analysis.

There are some shortcomings in the data set. Most excavated sites in the region have been dated to the Early Iron Age, 500 BC to AD 570 and, in general, there is a

Fig. 2: A considerable number of Scandinavian Iron Age settlements have been excavated since c. 1990. Several hundred settlements and several thousand buildings have been identified with machine-based deturfing (mechanical topsoil stripping). Here is an example from Hesby, Vestfold, Norway, illustrating a typical context from where the ^{14}C samples in this study are collected. Top: The Vestfold landscape. In the background the old Ra-road following the top of an Ice Age moraine named Raet. The Auli River in front is one of two rivers in Vestfold cutting through the moraine. The medieval and Iron-Age farmsteads are typically located on the rich agricultural plains on each side of the moraine. The main settlement areas in Vestfold are separated by outfields and forest. The area A was not deturfed when the aerial photo (top) was taken in 2009, but revealed a typical 'posthole building' from the Iron Age (bottom left). The area B (bottom right) shows the remains of ploughed-ver grave mounds near the farmstead and the old farm road (photos: Tom Heibreen (aerial photos) and Martin Gollwitzer; © Frode Iversen and Steinar Solheim, Museum of Cultural History; CC BY-SA 4.0).

higher proportion of documented Early Iron Age sites than Late Iron Age sites in south-eastern Norway (*Eriksen 2015*; *Gjerpe 2017*). The extensive excavations at the large Viking Age site of Kaupang applied dendrochronology rather than the radiocarbon dating method as the dating strategy (*Skre 2007*). Finally, there are few ^{14}C dates from the medieval period (AD 1000-1500), and dates from medieval towns were not collected systematically for the purpose of this paper. This makes it difficult to compare the long-term development patterns over the entire Iron

Age and into the medieval period. However, we consider the data set to be sufficient for the aims of this paper, especially for the investigation of the beginning of the decrease in human activity and population size.

To model the radiocarbon data, we used the UCL method, as developed by Shennan et al. (*2013*) and Timpson et al. (*2014*), with the R software codes provided by Edinborough et al. (*2017*). All collected dates were grouped into given time intervals – binned – at the site level to ensure that the sites and site phases were equally weighted in the summed radiocarbon probability distribution (*Timpson et al. 2014,* 555). This means that dates from the same site, when ordered chronologically, were placed in a new bin or group only if there was at least a 100-year gap between the date under consideration and the previous date. This account for oversampling, and sites with many dates and sites with few dates were equally weighted in the analysis.

First, the radiocarbon dates were calibrated using the IntCal13 calibration curve (*Reimer et al. 2013*). Next, all dates in each defined interval were combined to one uncalibrated date per bin. Then,

Fig. 3: Recently, it has been shown that the crisis is observable in the dendrochronology of timber found in the largest burial mound of northern Europe, the Raknehaugen of Romerike, Norway. Top: photo of Raknehaugen c. 1930. Bottom left: photo from the excavation in 1939. Bottom right: tree section from the Raknehaugen, which was built in AD 552. The timbers used as the building material were felled in AD 551. The abnormal tree ring (no. 15) representing AD 536 is marked in white (photo: H. Roll-Hansen, after Ording 1941; © Frode Iversen and Steinar Solheim, Museum of Cultural History. CC BY-SA 4.0.).

once one calibrated date was created per bin, all the calibrated data was summed to produce a calibrated summed radiocarbon probability distribution for the archaeological radiocarbon data (Fig. 4).

The summed radiocarbon probability distribution was compared with a null model comprising a large number of simulated radiocarbon data sets that were generated by a random sampling of the calendar dates from the chosen time interval, which was 2500 BC to AD 1500 in this study. The number of dates for the simulated dataset was similar to the number of bins in the archaeological dataset. The sampled calendar dates were 'back calibrated' by simulating a radiocarbon date that might have produced the calendar date. The back-calibrated dates were then recalibrated and summed. To create a distribution of simulated values, the procedure was repeated 5,000 times (see *Timpson et al. 2014*; *Edinborough et al. 2017* for a detailed explanation of the method). The simulated data set, which accounted for taphonomical effects in the data set, was compared with the archaeological data (*Edinborough et al. 2017*, 3). To evaluate the significance of the summed radiocarbon probability distribution, the empirical curve was compared with the 95% percentile interval calculated from the simulated data. When the summed radiocarbon probability distribution was above or below the 95% percentile, it reflected a positive or negative population signal (*Edinborough et al. 2017*, 2).

Results

In this case study, we investigated whether the summed radiocarbon probability distribution was consistent with the events that occurred in the mid-6th century on a regional scale. The red line in Fig. 4 shows a 200-year rolling mean for the empirical ^{14}C data. In general, the summed radiocarbon probability distribution demonstrates a steady increase in the dates and, consequently, the human population and activity from 2000 BC. During the Bronze Age, the rolling mean shows variations, with a peak at 1500 BC and a subsequent decrease from 1500 BC to 1000 BC. A significant increase is seen in the pre-Roman Period (500 BC-0) and in the Roman Period (AD 0-400), which both cross the percentile interval. With these exceptions, the curve largely remains within the confidence interval, and shows a steadily increasing, albeit fluctuating, population before a significant

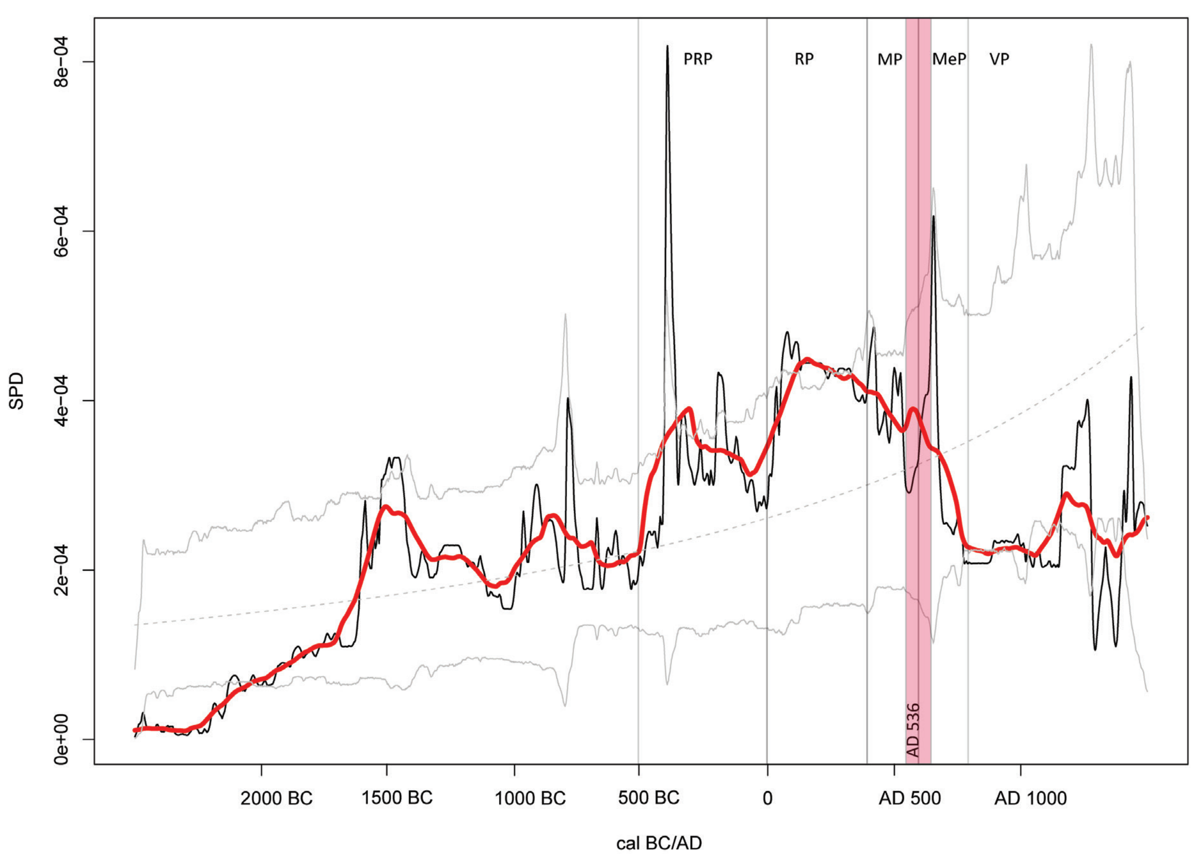

Fig. 4: The summed radiocarbon probability distribution from Vestfold, Norway. The empirical data are indicated by the black line, while the red curve shows a 200-year rolling mean. The grey curve represents the null model of exponential growth. A decrease is seen in the summed radiocarbon probability distribution in the first part of the 6th century (© Frode Iversen and Steinar Solheim).

demographic decrease that occurs between AD 550 and 800. This decrease crosses the percentile interval of the simulated data at AD 800.

Discussion

Let us return to the questions that were set out above: Was the mid-6th-century crisis caused only by sudden and severe climatic events, or did the Justinian Plague also affect the northern regions? The crisis' length represents a key factor in resolving this question to better understand the effects of the crisis on cultural activity.

The Old Norse term, *fimbulvetr*, appears both in *Vafþrúðnismál* (44-45) from the Poetic Edda and in *Gylfaginning* from Snorri's *Edda*, which is a 13th-century textbook of skaldic poetry. *Fimbul* means 'strong, hard, long', and *vetr* means 'winter'. Snorri describes *fimbulvetr* as a three-winter-long period without any summers. It followed a large world war that lasted for three winters. He associates *fimbulvetr* with the Ragnarrök, the darkness where divine powers face their demise. In the original Edda-poem *Vafþrúðnismál* (10th century?), we hear Odin asking the wise *jötunn-god*, Vafþrúðnir, to tell him who will survive the great winter. Vafþrúðnir answers that *Líf* (life) and *Lífþrasis* (life-clinger) will stay alive in the wood of Hoddmímir by living off morning dew. Ultimately, they will give birth to mankind again.

Líf ok Lífþrasir	*Líf and Lífþrasir (= Life and Life-striver/life-clinger)*
en þau *leynaz munu*	*they will shelter*
í holti Hoddmímis	*in the wood of Hoddmímir*
morgindöggvar	*morning dews*
þau *sér at mat hafa*	*they will have as food*
en þaðan *af aldir alask*	*the generations will reproduce from them*

(English translation adjusted after Zavaroni – Emilia 2006, 75*)*

The geographer and bryologist Johan Rutger Sernander (*1912*, 405) was the first scholar who connected *fimbulvetr* to real climatic events. Based on moss studies, Sernander was able to identify a major climate change in Scandinavia at the end of the Bronze Age. Sernander suggested that *fimbulvetr* occurred in the pre-Roman Period, then regarded as a period of cultural recession. The dating evidence was scarce and inaccurate, but Sernander was aware that heat-sensitive hazel trees had a wider northern distribution in the Subboreal Period (3710-450 BC) than the later Subatlantic Period, indicating a decrease in temperature. On the other hand, Sernander gained less support for his more specific dating of *fimbulvetr* to the pre-Roman Period. In 1956, the case of *fimbulvetr* was re-evaluated by an interdisciplinary group of scientists (*Bergeron et al. 1956*). A cyclical model was introduced that argued for a gradual cooling combined with humidity variations within half-millennium cycles; it challenged Sernander's linear model, which contained a sudden temperature decrease in ca. 450 BC (Fig. 5). Further, the mythological accounts of *fimbulvetr* were compared to Iranian and Altaic myths about similar disasters and extreme winters. It was even compared to Procopius's (VI, 15, 1) description of the northern people of Thule celebrating the sun and allegedly fearing that it would not return after the darkness of winter, while overlooking Procopius's now well-known description of sunshine as weak as moonlight in the year 536 (*Procopius 1916*, 329).

It was not until 1983, when Richard Stothers and Michael Rampino published an overview of known volcanic eruptions before AD 630, that scholars became increasingly aware of 'The Dust Veil' of AD 536-537 (*Stothers – Rampino 1983*; *Stothers 1984*; *Tvauri 2014*, 30). When combined, the global evidence is convincing. In 1994, Mike Baillie found abnormally small growth of Irish oak in AD 536 and 542, which complements Irish annals reporting a failure of bread in the year AD 536 and AD 536-539 (the *Annals of Ulster* / the *Annals of Inisfallen*) (*Baillie 1994*).

Beginning in 2001, the Scandinavian debate sharpened, set off by articles by Morten Axboe (*2001*) and Bo Gräslund (*2007*), which explicitly connected *fimbulvetr* to the year AD 536. Researchers in the first decade of the 21st century were concerned with whether such an event really occurred. Later, researchers acknowledged the crisis but pointed to a longer cold period that lasted until AD 660. Regarding these events in Sweden and Norway, there are generally fewer indications of settlements, graves, material culture, iron production, and fortifications during the crisis period than the periods directly before and after it (*Gräslund – Price 2012*, 432).

Recent aDNA studies have indicated that recurring plague epidemics occurred until AD 750, influencing settlement development (*Harbeck et al. 2013*; *Little 2007*). It is therefore likely that there were more factors at play than only the 'The Dust Veil', which lasted for a shorter period than the epidemics. In the uplands of southern Sweden, Daniel Fredh et al. (*2013*) showed that palynological richness increased during the inferred land-use expansion after AD 350 and decreased during the subsequent regression in AD 550-750. After AD 550, grass (*Poaceae*) decreased significantly in the pollen records, while *Cerealia* and herbs either rarely occurred or decreased in abundance. There was also an increase in tree cover in former agricultural areas. In summary, this indicates an agricultural land-use regression and the abandonment of agricultural land (*Fredh et al. 2013,* 3169-3170).

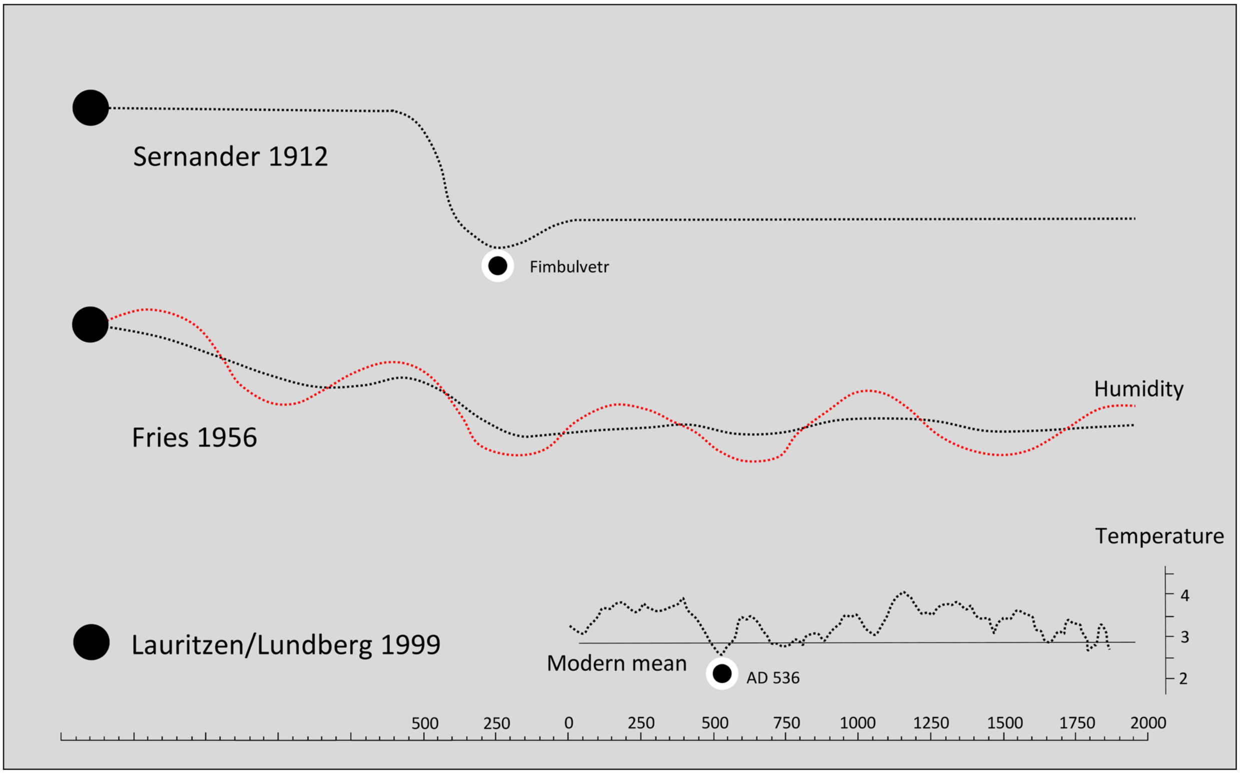

Fig. 5: The understanding of temperature variation and climate change has developed considerably during the last century. The figure shows Johan Rutger Sernander's (1912) linear model of late Holocene temperature with a severe temperature drop in the pre-Roman Period, interpreted as the fimbulvetr. In the 1950s, Magnus Fries developed a cyclical model with repeating changes in temperature and humidity every 500 years (Bergeron et al. 1956). Today's methods allow for a much more detailed modelling of the past climate, exemplified here by Lauritzen and Lundberg's (1999) temperature curve based on analysis of cave dripstones (speleothems) from Northern Norway (© Frode Iversen and Steinar Solheim).

The results of our study are relatively unambiguous: They show that there was a marked drop in cultural activity in central Scandinavia during the mid-6th century. The data indicate that a downward trend was already occurring from AD 200 to 400, but interpretative caution is advised for this result, as the curve is well within the 95% confidence interval. It could be related to social changes reflected in the archaeological material seen from c. AD 400 on(*Gjerpe 2017,* 196), but this needs to be investigated more thoroughly. The most severe decline starts in AD 500-550 and ends ca. AD 800. This indicates a dramatic drop in human activity and, most likely, a crisis lasting for several centuries.

The significant drop in the modelled radiocarbon data is concurrent with the events occurring in the mid-6th century. The modelled radiocarbon data thus provide another proxy for the significant changes that occurred at this time. These results may support the idea that *fimbulvetr* was the start of a long-lasting cooling period that, combined with severe population declines possibly explained by the recurring plague outbreaks in AD 540-750, resulted in the dramatic decrease in cultural activity that we see in our data. This case study covers an archaeologically well-recorded region in the Scandinavian heartland, but future comparisons with other regions are necessary to investigate this pattern further. An important aspect that needs to be given more consideration is how the crises affected various landscapes. Did they affect the northern areas more severely than the southern areas (*Toohey et al. 2016*), indicating that climate change was the main factor, or did the crises affect all regions in Scandinavia equally, indicating a highly contagious plague? We cannot assume that individual climate-change events identified on a global scale necessarily had significant impacts on human activity on the local or regional scale (*Griffiths – Robinson 2017*, 6). In this specific case, the consequences of the crises that occurred in the mid-6th century have left a clear footprint in the archaeological record, and the event was of such magnitude that it also left a mark in written sources across Europe. Climate simulations also imply that marginal agricultural societies in Northern Europe probably faced multiple years of crop failures within a single decade as a result of two volcanic eruptions (*Toohey et al. 2016*). The modelled data provide an interesting first step towards a more thorough analysis of the changes that occurred in the 5th and 6th centuries. A logical next step is to analyse several other regions in Scandinavia and consider the impact of the event on different landscapes and regions.

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