CHAPTER 1

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Environment and settlement at Vik, Ørland: A phase framework

ABSTRACT
An aim of the excavation project at Vik was to gain a coherent understanding of the relationship between landscape development, vegetation history, climatic change and settlement at Vik from the Late Bronze Age to the early medieval period. The flat profile of the Ørland peninsula and the postglacial land upheaval have caused a profound transformation of the landscape since the peninsula rose from the sea c. 600+/-100 BC (Romundset & Lakeman, Ch. 2). A sheltered bay formed a safe harbor during the period from c. 400 BC to AD 600, when the bay eventually dried out and left the settlement at Vik in a less strategic position. An extensive pollen analysis provided data on vegetation history, and also on effects of climatic change (Overland & Hjelle, Ch. 3). A generalized interpretation of archaeological and botanical data from Vik suggests periods of intensive settlement and agriculture in the Pre-Roman Iron Age and Roman Iron Age, while the Migration Period was a period of decline. Settlement and agriculture nearly disappeared in Vik during the Merovingian and Early Viking periods, coinciding with the re-vegetation of the landscape after the global climatic catastrophe of AD 536. Vik was re-settled very late, not before c. AD 950, possibly because of the extinction of the bay and the harbor due to land upheaval. In this paper, land upheaval, vegetation history and settlement development at Vik are combined in a scheme of ten phases. The phasing provides an introduction and a chronological and interpretational framework to the papers in this book.

INTRODUCTION
The landscape of the Ørland peninsula is particularly flat, compared to the hilly coastal landscape surrounding the mouth of the Trondheimsfjord (Figure 1). The flatness of the landscape in combination with the postglacial land upheaval has caused profound transformation of the landscape since the highest part of the peninsula rose from the sea in the Late Bronze Age (Kjemperud 1986). Today, Vik is found in the central part of Ørland, but the landscape profile of the peninsula reveals that there was a bay east of Vik during parts of the period between the time when the highest ridge rose from the sea and now. This landscape feature

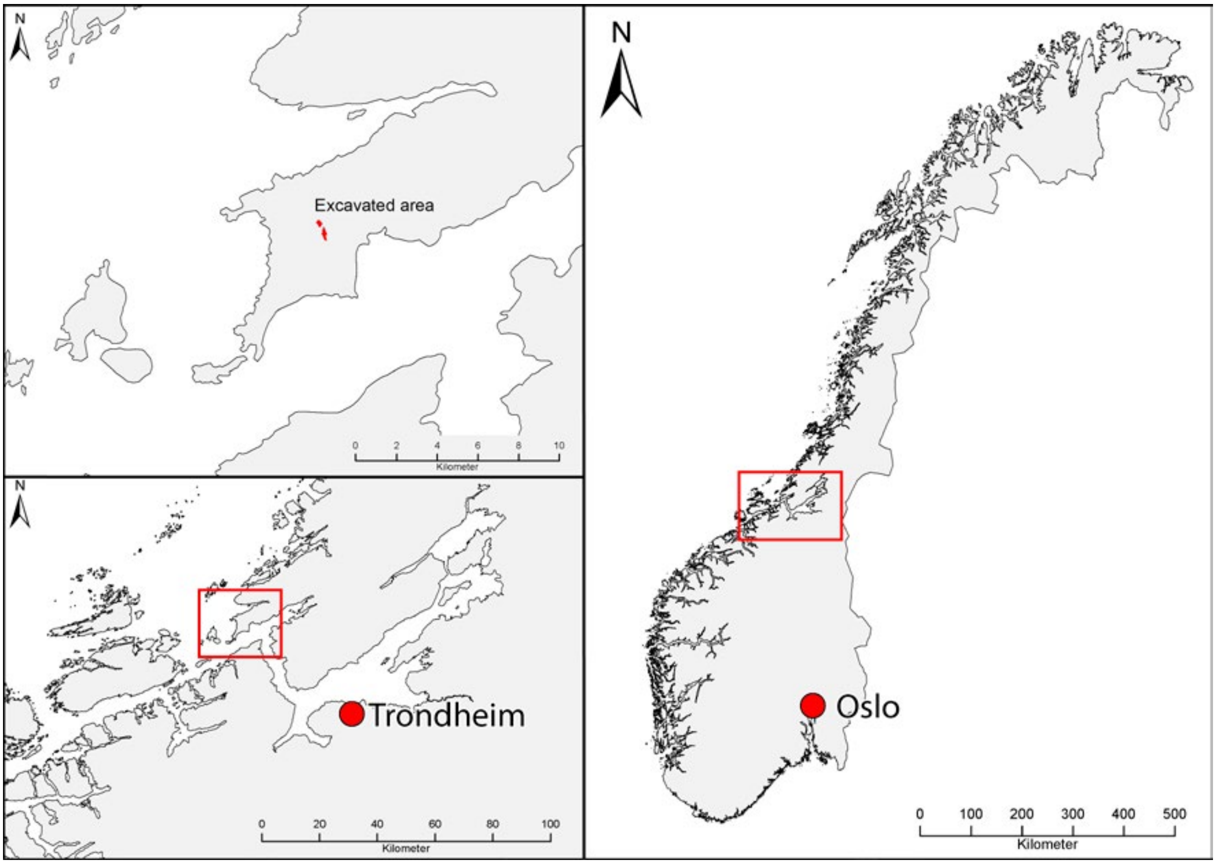

Figure 1. The location of the excavated area at Vik. Illustration: Magnar Mojaren Gran, NTNU University Museum.

is reflected in the name of the area, Vik meaning *bay*. Vik is an uncomposed natural name, and thus it belongs to the oldest strata of Norwegian farm names (Sandnes 1997:34).

Archaeological surveys prior to the extension of Ørland main air base revealed relatively dense traces of Iron Age and early medieval settlement concentrated along the highest part of the central land ridge at Vik. Most settlement traces were found between 9 and 11 m.a.s.l., which marked the top of the ridge (Haugen, Sjøbakk & Stomsvik 2014). Several other farms are also found on this ridge, among them Ryggen north of Vik, and Viklem and Hovde south of Vik. A large proportion of Ørland's recorded visible and non-visible archaeological remains are located along the ridge, around the extinct bay, or at the natural harbor at Uthaug on the northern shore of the peninsula (Figure 2).

The ridge is well-drained, and is largely composed of a mixture of gravel and shell-sand. The lower-lying land to the east and the west of the ridge consists to a large extent of bogs and wetlands formed on top of marine sediments such as clay and silt. Today, most of these areas are drained and cultivated. However, bogs and wetlands dominated these areas until modern cultivation commenced in the second half of the 19th century (Schøning 1979:293, Berger 2001:36-37). Pre-modern agriculture concentrated

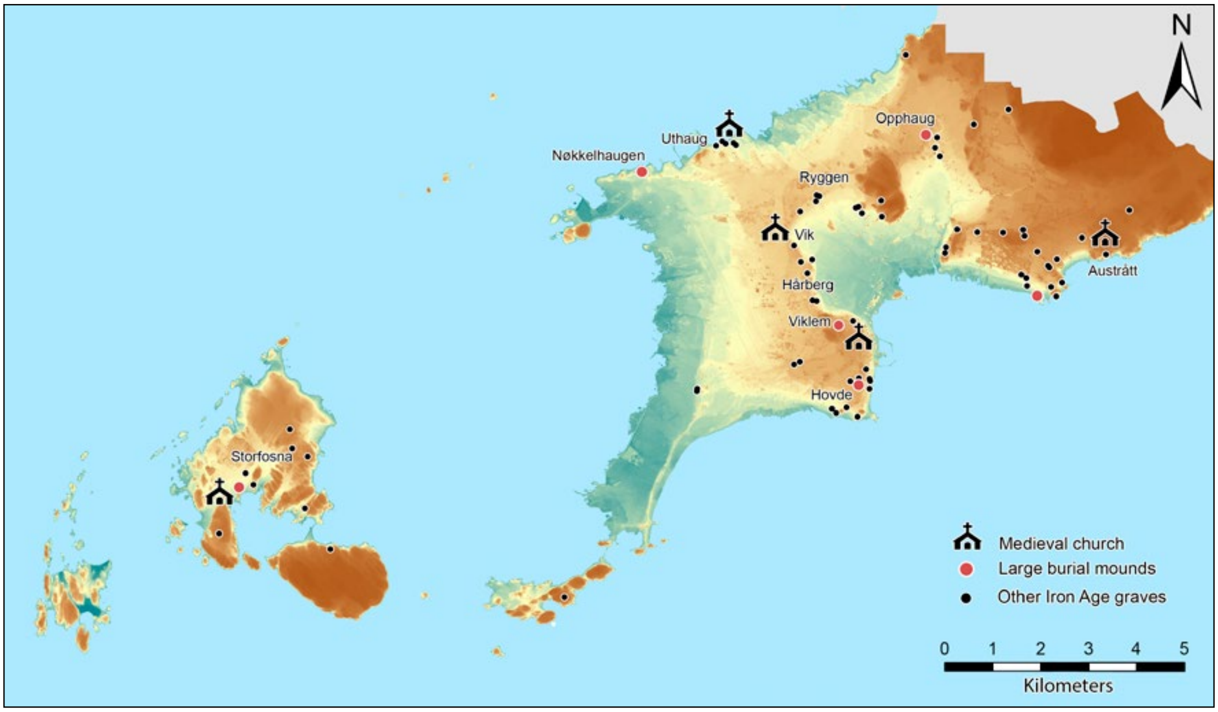

Figure 2. Large burial mounds, Iron Age graves and medieval churches in Ørland. The stone churches at Austrått and Viklem are still standing. Illustration: Magnar Mojaren Gran, NTNU University Museum.

on the self-drained ridge. Detailed pollen analysis from Ryggamyra and from archaeological contexts at Vik confirm that wetland areas were found close to the settlement sites throughout the Iron Age and early medieval period (Overland & Hjelle, Ch. 3).

The natural historical and cultural historical preconditions of the excavation site led the excavation project to focus on the relationship between landscape development, vegetation history and settlement from the Late Bronze Age to the early medieval period (Ystgaard & Sauvage, 2014). Cross-disciplinary cooperation proved essential in the work of this project. In this paper, we explore how shoreline data from the outer Trondheimsfjord area, and pollen data from the Bjugn/Ørland region and from local contexts at Vik, correspond with archaeological data from the excavations of Iron Age and early medieval settlements at Vik. In order to arrange the different data sets in a common framework, a phasing of the settlement at Vik in ten stages was developed. While employing settlement data as a point of departure, shoreline data and vegetation history data have been included in the phasing in order to develop the interpretation of the main sequence of events in each phase. The phasing provides a background and a chronological and interpretational framework for the following chapters of this book.

METHODS AND MATERIAL: GEOLOGY, VEGETATION HISTORY, ARCHAEOLOGY, AND RADIOCARBON DATING

In order to provide a detailed shore displacement curve for the last 3000 years in the outer

Trondheimsfjord region, geologists from the Geological Survey of Norway collected sediment samples from four isolation basins in the region near the excavated area (Romundset & Lakeman, Ch. 2). A shore displacement curve from the region already existed, and indicated that the shoreline fell below 11 m. a. s. l. about 3000 years before present (Kjemperud 1986). However, this assessment was based on a single isolation basin record. The objective of the new study was to gather more data for late Holocene shoreline changes at Ørland, in order to improve our knowledge of the rates of relative sea-level changes. The method employed in this study is described in detail in Romundset & Lakeman, Ch. 2. In the Ørland case, close co-operation between geologists and archaeologists meant that the geologists could also rely on dates from the archaeological excavations when calibrating their own results.

To provide vegetation history data on a regional scale, botanists from the University of Bergen analyzed pollen from the geologists' sediment core from Eidsvatnet in Bjugn, approx. 11km to the east of the excavation area. Eidsvatnet was the closest isolation basin to the site (Romundset & Lakeman, Ch. 2, Figure 4; Overland & Hjelle, Ch. 3, Figure 1). To provide data on a local scale, a turf core sample was taken from Ryggamyra, approx. 1km north of the northernmost part of the excavation area (Overland & Hjelle, Ch. 3, Figure 1). Ryggamyra was the closest preserved peat bog to the excavation site. To provide pollen data recording on-site vegetation during the settlement, the botanists analyzed samples from archaeological features in the excavation area. Based on the cores and on-site samples, an outline of the history of vegetation at Ørland and Vik was established (Overland & Hjelle, Ch. 3). The Eidsvatnet sediment core covered the period back to 2135+/-30 BP, while the Ryggamyra peat core went back to 2340 +/-30 BP (Overland & Hjelle, Ch. 3, Figures 4 and 5). Thus these cores do not give information on the vegetation in the earliest phases of occupation at Vik (below).

Archaeological questions and objectives set the framework for the work of the cross-disciplinary team that evolved around the excavation project. Large-scale top-soil stripping, digital documentation and Geographical Information Systems (GIS) analysis were the main tools used during collection and analysis of archaeological data. Digital documentation and GIS are prerequisites in order to collect, store and analyze the vast amount of data which a large-scale archaeological excavation produces (Løken et al. 1996, Rønne 2004, Gran 2018).

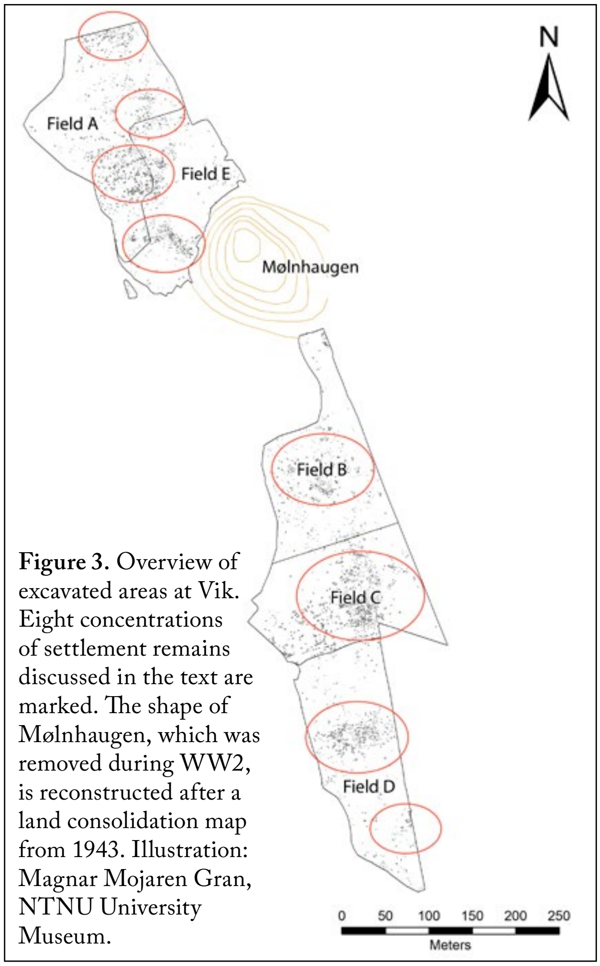

Figure 3. Overview of excavated areas at Vik. Eight concentrations of settlement remains discussed in the text are marked. The shape of Mølnhaugen, which was removed during WW2, is reconstructed after a land consolidation map from 1943. Illustration: Magnar Mojaren Gran, NTNU University Museum.

The excavations at Vik revealed eight concentrations of Iron Age and early medieval settlement traces along the highest part of the ridge, at intervals of 150–500 m (Figure 3). Radiocarbon dates from excavated features revealed that all eight concentrations had traces of use in the Pre-Roman Iron Age (c. 500–1 BC), with most substantial traces in Field B as well as in the two northernmost concentrations in Field A. The seven northernmost concentrations also had traces of use in the Roman Iron Age (c. AD 1–400). Three out of these concentrations had intensive traces of use in the Roman Iron Age (central parts of Fields A and E, central part of Field C, and central parts of Field D). Activity in Field C and the southern part of Field E lasted into the earliest part of the Migration period (c. AD 400–500). During the last part of the Migration period (c. AD 500–575), the Merovingian Period (c. AD 575–800) and the first part of the Viking Age (c. AD 800–950), there were almost no signs of activity in any of the eight settlement concentrations. In the southern part of Field E, settlement was resumed in the Late Viking Age and early medieval period (c. AD 950–1250).

Top-soil stripping excavations are heavily reliant on radiocarbon dating in order to build chronological sequences and interpretations. Most radiocarbon dates from Vik were analyzed by the National Laboratory for Age Determination at the NTNU University Museum. Great emphasis was put on radiocarbon dating on carbonized material from a wide range of archaeological features. Altogether 610 ^{14}C dates have been calculated. 210 dates are from charred material from cooking pits, while 116 dates are from charred material from postholes, divided between 30 buildings (Figure 4). The remaining dates include carbonized material, and in a few instances bones. These remaining dates stem from hearths, waste deposits, wells, agricultural layers, ditches and sunken lanes. Dates from cooking pits and postholes represent settlement traces which are found in all parts of the excavation area. Their relatively large number indicates a certain correlation with the settlement activity over time. However, cultural preferences regarding the use of cooking pits and building constructions with postholes remain a source of error. Cooking pits and postholes in buildings dominate in the Pre-Roman Iron Age, Roman Iron Age and Migration period. The use of cooking pits, as a general rule, decrease markedly from the onset of the Merovingian period (Bukkemoen 2016, Grønnesby 2016), while the use of postholes in buildings also decreases from the Merovingian period, however not as rapidly as the use of cooking pits (Eriksen 2015, Sauvage & Mokkelbost 2016). Re-structuring of the built environment and the disuse of cooking pits could therefore explain the decrease in dates recorded from the Merovingian period onwards. However, natural historical data from Vik indicate that a decrease in activity did take place in the Merovingian period (Overland & Hjelle, Ch. 3).

Source critical considerations must be made when choosing features for sampling and sample material for radiocarbon dating, as well as when interpreting the radiocarbon dating results (Gustafson 2005, Loftsgarden et al. 2013, Diinhoff & Slinning 2013, Herschend 2016, Fransson 2018a). In Vik, most buildings have no preserved hearth. This leaves us with the buildings' postholes for sampling for radiocarbon dating. Postholes are not closed features, and charred material could enter postholes in different ways. If the posthole was dug through an existing cultural layer when the building was erected, chances are that older, charred material could be mixed into the posthole fill. If the posts were removed from the holes after the building had been abandoned, younger charred material could be trapped in the hollow left by the post. Also, charred material in the posthole could stem from activity within the building during its lifetime. If poles were

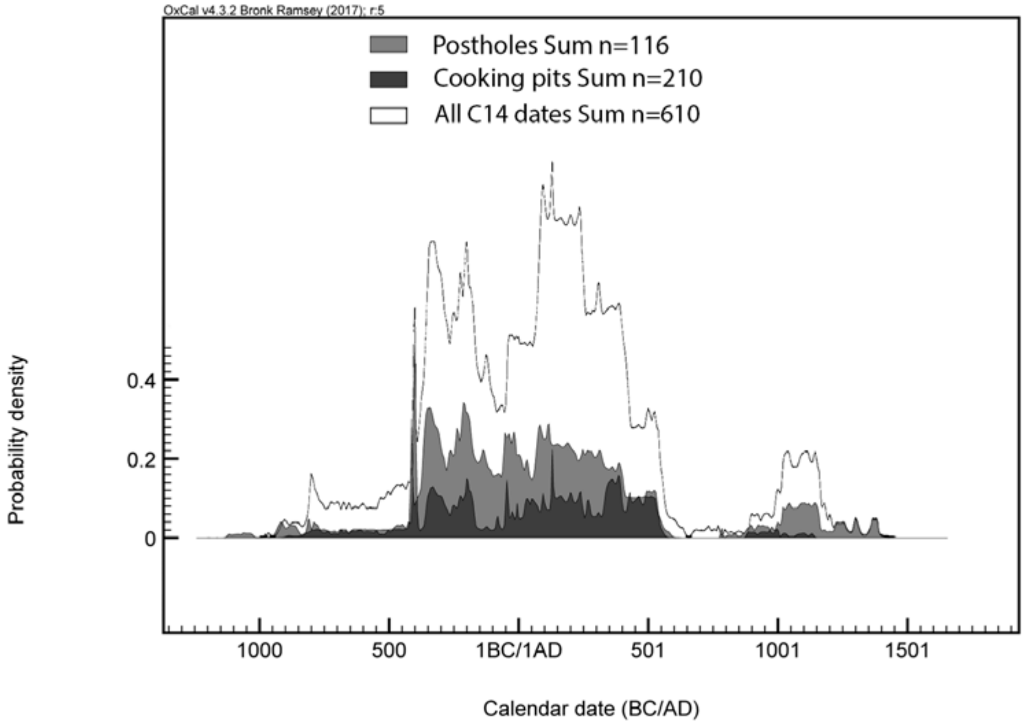

Figure 4. Summed probability distribution of radiocarbon dates from Vik. Illustration: Magnar Mojaren Gran, NTNU University Museum.

fired in the lower end to prevent them from rotting, charred material from the poles themselves could be preserved in the posthole fill. To ensure that such material was selected for sampling, samples were always taken from the post impression if such an impression was preserved. At Vik, however, post impressions were seldom preserved, so we were left with dating material from postholes which could in theory both pre- and postdate the life span of the building investigated (cf. Gustafson 2005:55, Diinhoff & Slinning 2013:66). To compensate for this important source of error, a series of postholes from each building were dated, and results compared and interpreted in relation to their archaeological context (see Ystgaard et al. 2018 for detailed discussions regarding the dating of each building).

The own age of the dated material must also be considered (Gustafson 2005:55, Loftsgarden et al. 2013:60). Thus charred grains with a lifetime of only one year were preferred as dating material to charred wood with a considerably longer possible lifetime. Deciduous wood species were preferred to coniferous wood species, as oak was not represented in the material and spruce was represented only to a small extent. Also, twigs and bark were preferred to larger pieces of charred wood. In some instances, we were left with no other option but to date material with a possible high own age. This has been taken into consideration in the interpretations of the dates of the features in question (see Ystgaard et al. 2018 for detailed discussions of each feature). At Vik, dates on carbonized straw tended to be dated one to two

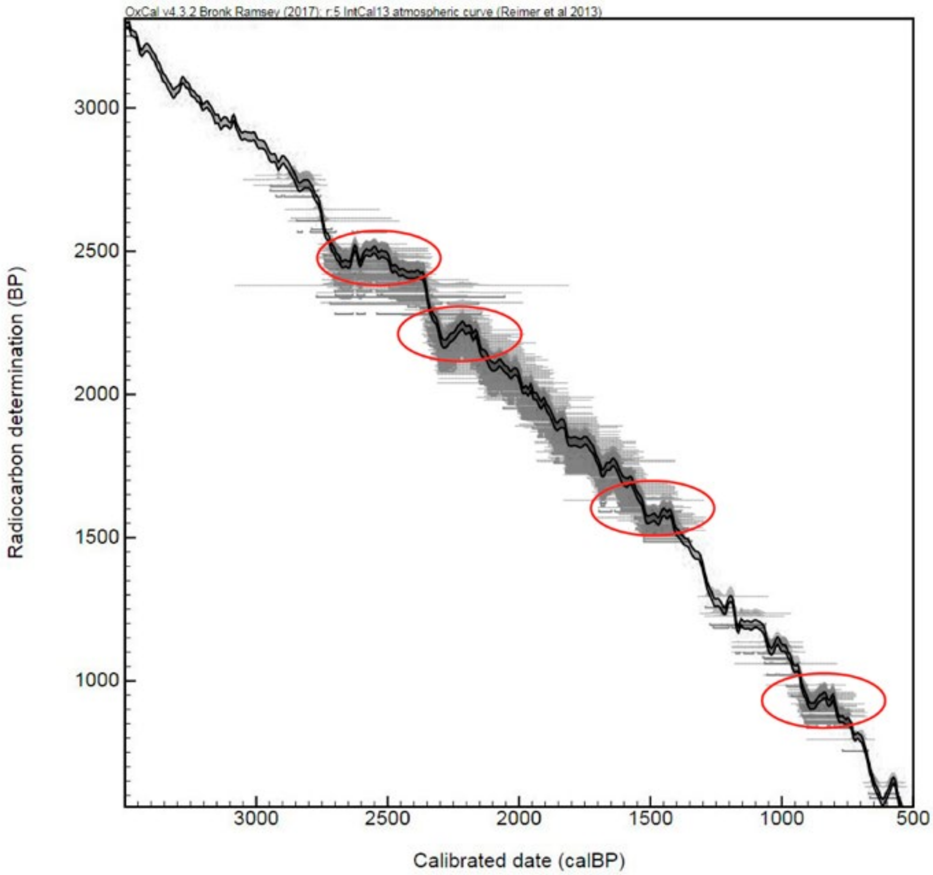

Figure 5. The calibration curve (IntCal13) with the radiocarbon dates from Vik. Parts of the curve with less nuanced dating results are highlighted. Illustration: Magnar Mojaren Gran, NTNU University Museum.

hundred years older than the date implied by the context. Our hypothesis is that this could be a result of a marine reservoir effect (Bondevik et al. 1999). The straws grew on relatively recently exposed marine sediments and took up carbon from them (Alexandre et al. 2016). This could have caused the high age of the dates (Martin Seiler, personal communication). The radiocarbon dates from Vik are here shown as a summed probability distribution (Figure 4).

Variations in the natural ^{14}C content cause the ^{14}C clock rate to vary through time, causing the need for calibration of the ^{14}C timescale. Between c. 800–400 BC there is a problematic range, or a plateau, in the calibration curve, often named the Hallstatt plateau after the famous find site in Austria dating to this period. The plateau causes all radiocarbon dates from this period to calibrate to c. 800–400 BC. This means that chronological sequences within the frames of this period cannot be distinguished (van der Plicht 2004). Shorter plateaus exist between c. 400 and 200 BC, c. AD 350–550 and c. AD 1050–1220 (Figure 5).

Phase	Period (approx.)		Activity emerges	Activity ceases	Buildings
0	1100–800 BC	Bronze Age	Vik emerges from the sea. Sporadic activity in Field E.		-
1	800–400 BC	Bronze Age / Pre-Roman Iron Age	Pioneer settlement, first possible building in Field A.		House 1, Field A
2	400 BC–50 BC	Pre-Roman Iron Age	Farm settlement in Field B, cooking pits in other areas.		House 9, Field A Houses 3, 6, 7, 8, 10, 11, 13, Field C House 18, Field B
3	50 BC–AD 350	Roman Iron Age	Farm settlement in Fields A, C and D. Waste deposits in Fields A and C.	Farm settlement in Field B ceases	House 31, Field A Houses 2, 4, 15, 16, 17, 34, Field C Houses 21, 22, 23, 24, 26, 28, 29, 30, Field D
4	AD 350–550	Migration period		Farm settlement in Field D ceases	House 25, Field E
5	AD 550–900	Merovingian period / Viking Age		Farm settlement in Fields A, C and E cease	-
6	AD 900–1250	Late Viking Age /early medieval period	Farm settlement in Field E		Houses 20, 38 Field E. Possibly Houses 5, 14, 27 and 40, Field E
7	AD 1250–1850	High and late medieval period / modern period	Pasture, all fields	Farm settlement in Field E ceases	-
8	AD 1850–1940	Modern period	Modern farm settlement in Fields A, B, D and E		4 farms: Øveraunet 70/3, Field A. Øveraunet 70/8, Field E. Lundheim 70/41, Field B. Lykkens prøve (Tokstad-gården) 70/4, Field D.
9	AD 1940–present	Recent	Air station	Modern farms cease	-

Table 1. Settlement phases at Vik. Dates are in calibrated years.

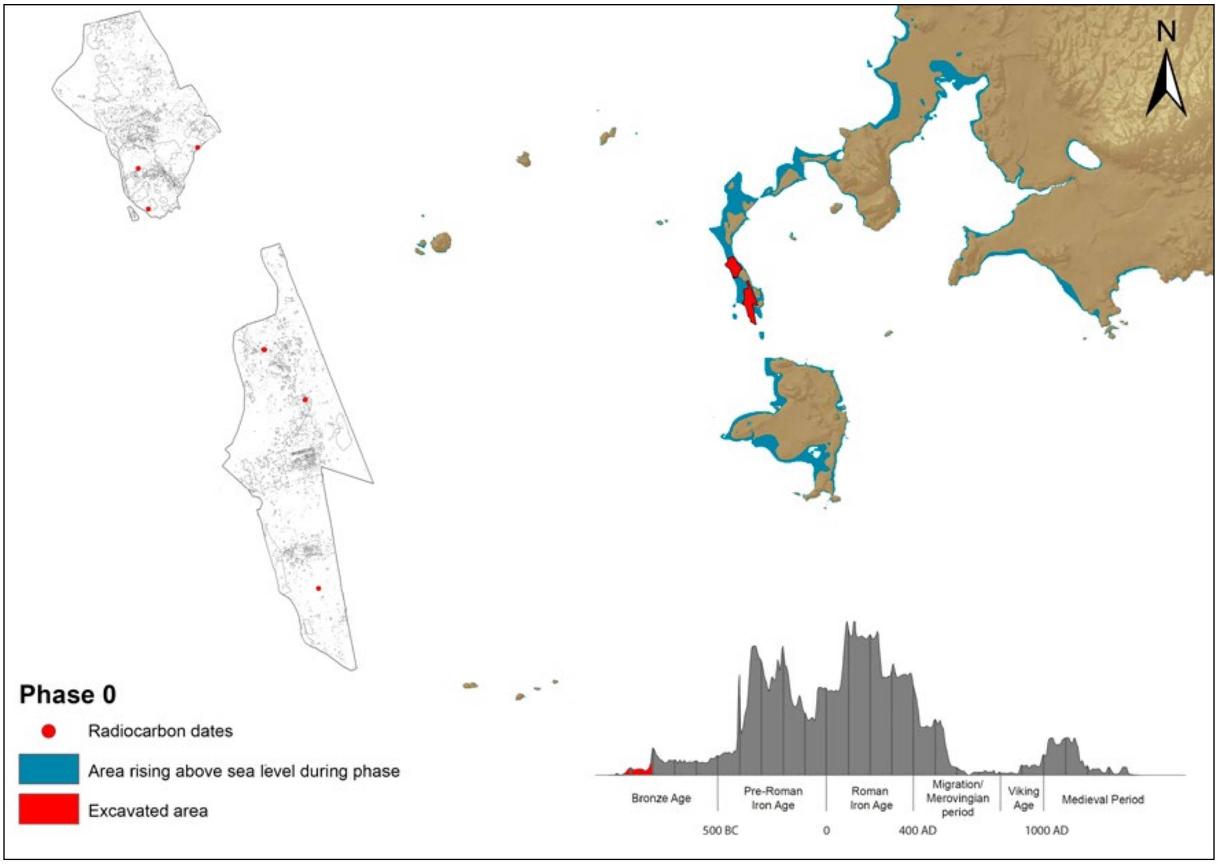

Figure 6. The shoreline at Ørland and dated features at Vik in Phase 0. Illustration: Magnar Mojaren Gran, NTNU University Museum.

RESULTS: DATING AND PHASING OF THE VIK SETTLEMENT

Phase 0 c. 1100–800 BC: Early activity near the high-water mark (Figure 6)

The highest parts of the ridge at Vik, apart from the now removed Mølnhaugen, rose above the high-water mark around 2600 +/- 100 BP (Romundset & Lakeman, Ch. 2). Dates of four cooking pits in Fields A and E, all earlier than the Hallstatt plateau in the calibration curve c. 800–400 BC, show that the land was temporarily accessible at this early stage (pits 207130, 205573, 201658, 140064, cf. Ystgaard et al. 2018). Still, sea spray and storm surge must have made the newly exposed land unsuitable for permanent occupation (Romundset & Lakeman, Ch. 2). Vegetation was probably scarce, although, as noted above, we have no pollen data at this early point.

Phase 1 c. 800–400 BC: Pioneer settlement (Figure 7)

The duration of this phase corresponds with the duration of the Hallstatt plateau in the calibration curve, which means the calibrations cover a wide time range and hinders closer dating of events within this time span. During this period the land kept rising from the sea, and sea spray and storm surge became less of a problem. Dates to this phase from archaeological features mainly stem from

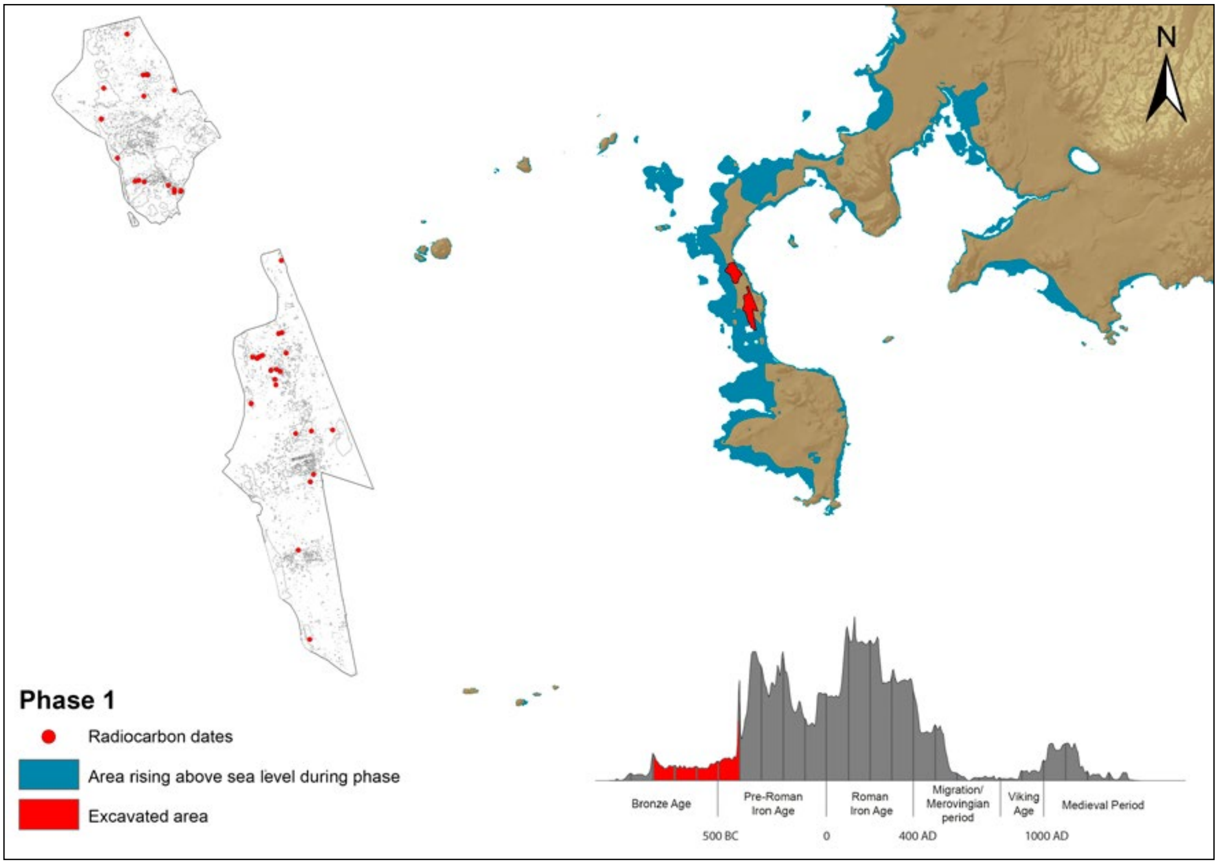

Figure 7. The shoreline at Ørland and dated features at Vik in Phase 1. Illustration: Magnar Mojaren Gran, NTNU University Museum.

cooking pits. As a rule, the cooking pits are found in areas that became permanently settled later on. It is possible, but not certain, that the very earliest permanent settlement at Vik was established in this period. The house in question, House 1, is difficult to date precisely, since the Hallstatt plateau causes dates from the building to calibrate over the wide range of 800–400 BC (Fransson, Ch. 5).

Phase 2 c. 400–50 BC: Farm settlement Field B, cooking pits (Figure 8)

The Vik ridge became fully accessible for settlement and agriculture during Phase 2. Dates from Phase 2 were recorded in all eight areas with concentrations of archaeological features at Vik (Figure 3). Cooking pits from Phase 2 were recorded in all eight areas, while houses from Phase 2 were only recorded in four out of the eight areas. Areas which included houses were as follows: the two northernmost settlement areas in Field A with one house each (Houses 9 and 1), the central part of Field B with seven houses (Houses 3, 6, 7, 8, 10, 11, and 13), and the central part of Field C with one house from Phase 2 (House 18). Thus, Field B represents an early example of a *fixed* settlement (Gjerpe 2017:130-131) from the middle and late part of the pre-Roman Iron Age (Fransson, Ch. 10, Ystgaard, Ch. 12). The overall impression of Phase

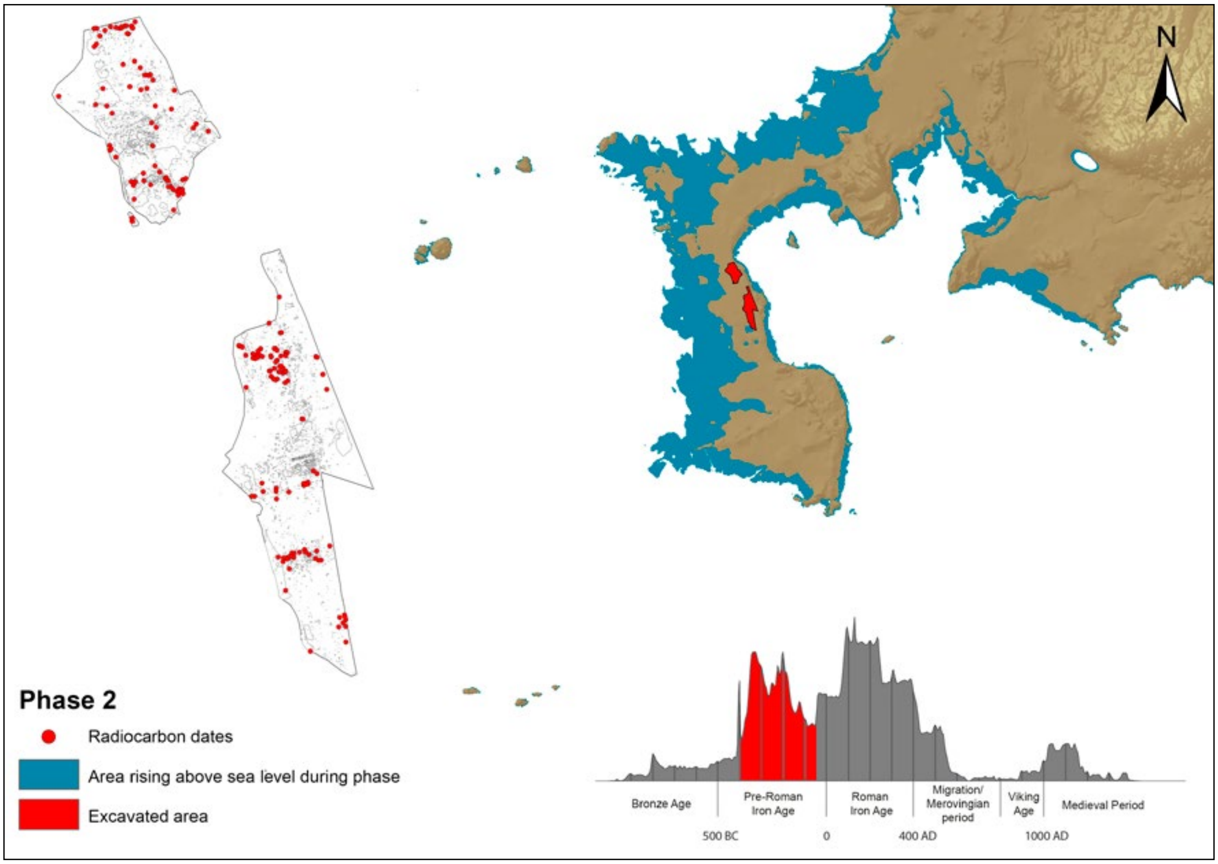

Figure 8. The shoreline at Ørland and dated features at Vik in Phase 2. Illustration: Magnar Mojaren Gran, NTNU University Museum.

2 settlement is thus both of an extensive nature, with diverse settlement traces spread over most of the excavation area, and of a more intensive nature, concentrated in Field B.

Pollen analysis of the sediment core from Eidsvatnet shows an open and grass-rich vegetation in the region during Phases 2 and 3. Analysis of the peat core from Ryggamyra in Phases 2 and 3 shows local marsh vegetation, indicating that new land to the east of the Vik ridge was wet and dominated by bogs and marshes. Traces of agricultural activity and animal husbandry from nearby settlements were present in the Ryggamyra core, represented by pollen from barley, herbs and weeds, as well as high charcoal values. Pollen samples from on-site archaeological features showed barley, heath vegetation, and shore vegetation (Overland & Hjelle, Ch. 3). Human influence on the vegetation through animal husbandry and agriculture was thus present in this phase of extensive settlement, which was characterized by mixed farming combining animal husbandry and crop cultivation. A fishing sinker (T27071:4) found in a pit dated to this phase highlights the importance of marine resources, even though other material indicating fisheries is lacking from this phase.

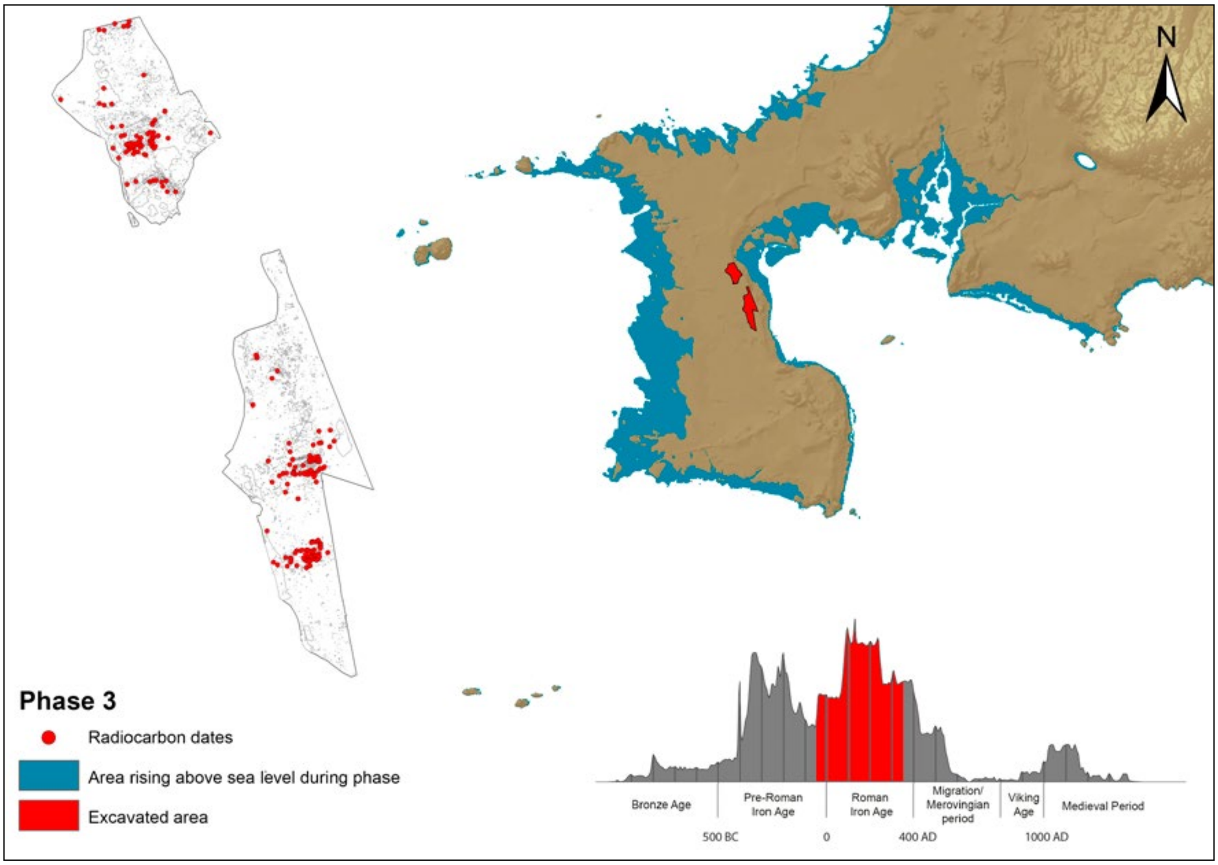

Figure 9. The shoreline at Ørland and dated features at Vik in Phase 3. Illustration: Magnar Mojaren Gran, NTNU University Museum.

Phase 3 c. 50 BC – AD 350: Farm settlement in Fields A, C and D (Figure 9)

Phase 3 was characterized by significant settlement concentrations in Fields A / E, C and D (Figure 3). Settlement in the central parts of Fields A / E consisted of three large waste deposits, containing large amounts of animal bones, fish bones, cockles and sea shells as well as artefacts (Storå et al. Ch. 8, Mokkelbost Ch. 7, Solvold Ch. 9). Damage caused by later activity hindered the recognition of buildings connected to the waste deposits, except for House 31 (Ystgaard Ch. 12). In the central part of Field C, altogether seven buildings were identified, of which one was dated to Phase 2 (House 18), four to Phase 3 (Houses 4, 16, 17, and 34) and two to the late part of Phase 3 and the early part of Phase 4 (Houses 2 and 15, Heen-Pettersen & Lorentzen Ch. 6). Comparable to Fields A / E, extensive waste deposits containing large amounts of animal bones, fish bones, cockles and sea shells as well as artefacts characterized Field C in Phase 3. Bones and artefacts were also retrieved from the buildings, most from House 2 (Storå et al. Ch. 8, Mokkelbost Ch. 7, Solvold Ch. 9). In Field D, eight buildings were identified, all of them dated to Phase 3 (House 21, 22, 23, 24, 26, 28, 29, and 30), but no large waste deposits were preserved (Heen-Pettersen & Lorentzen Ch. 6). Settlement in

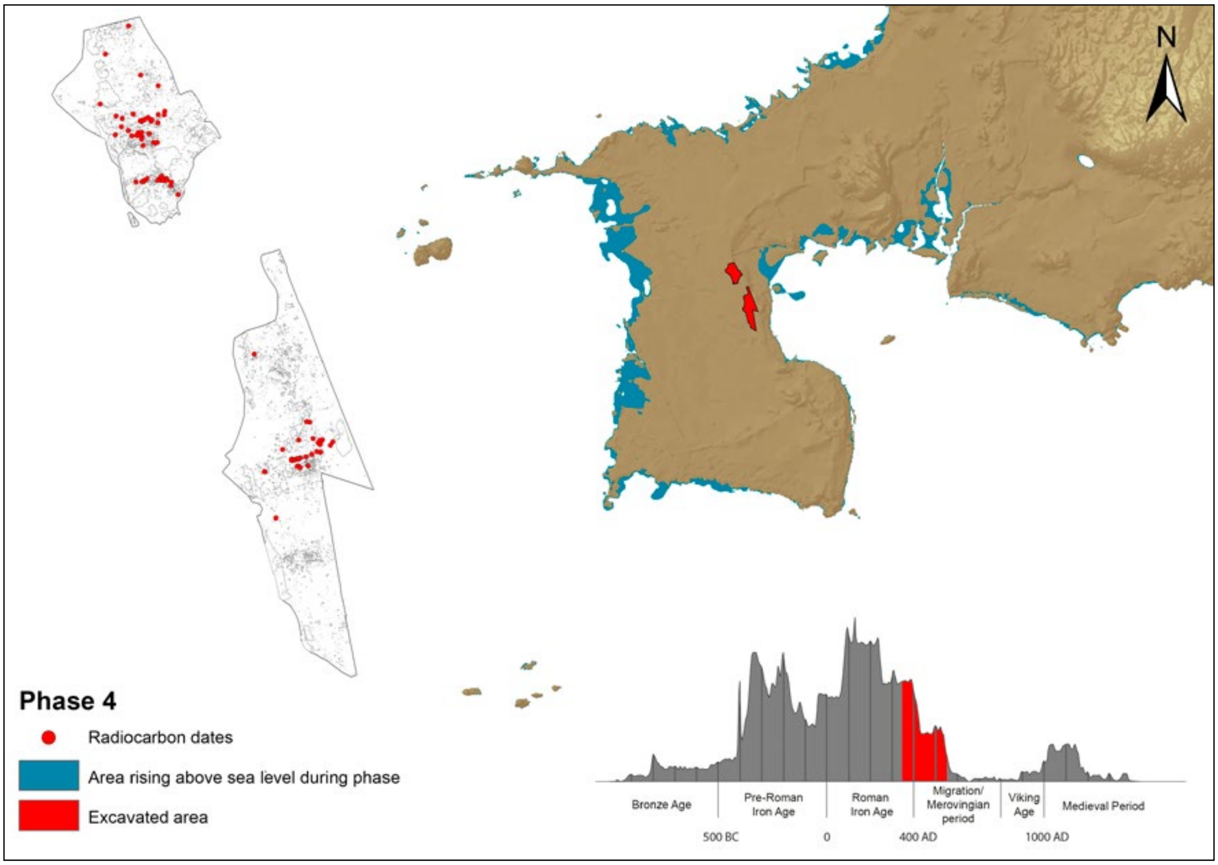

Figure 10. The shoreline at Ørland and dated features at Vik in Phase 4. Illustration: Magnar Mojaren Gran, NTNU University Museum.

Field D vanished towards the end of Phase 3, while settlement in Fields A and C lasted into Phase 4.

The available land increased steadily during Phase 3. However, only the highest part of the ridge was naturally drained, while the emerging land to the east consisted mainly of beach areas, and to the west partially of marsh and partially of beach areas. Thus land suitable for agriculture did not increase significantly, while grazing areas probably increased to a certain extent. The sheltered bay to the east of Vik receded and diminished somewhat in size throughout the phase, but it was probably still well suited for landing boats safely from the elements, such as the prevailing southwestern winds.

No major differences between Phases 2 and 3 were recognized in the pollen diagrams from Eidsvatnet and Ryggamyra (Overland & Hjelle Ch. 3). Analysis from a water hole in Field D shows that the landscape was completely open, with prominent crop cultivation with barley. Other indicators of agriculture and animal husbandry were weeds and herbs. Fungal spores indicating dung – and thus animal husbandry – were present (Overland & Hjelle 2017:55, Ch. 3).

Phase 4 c. AD 350–550: Recession (Figure 10)
Settlement in Fields A and C lasted into Phase 4, but no new buildings were erected. The indications

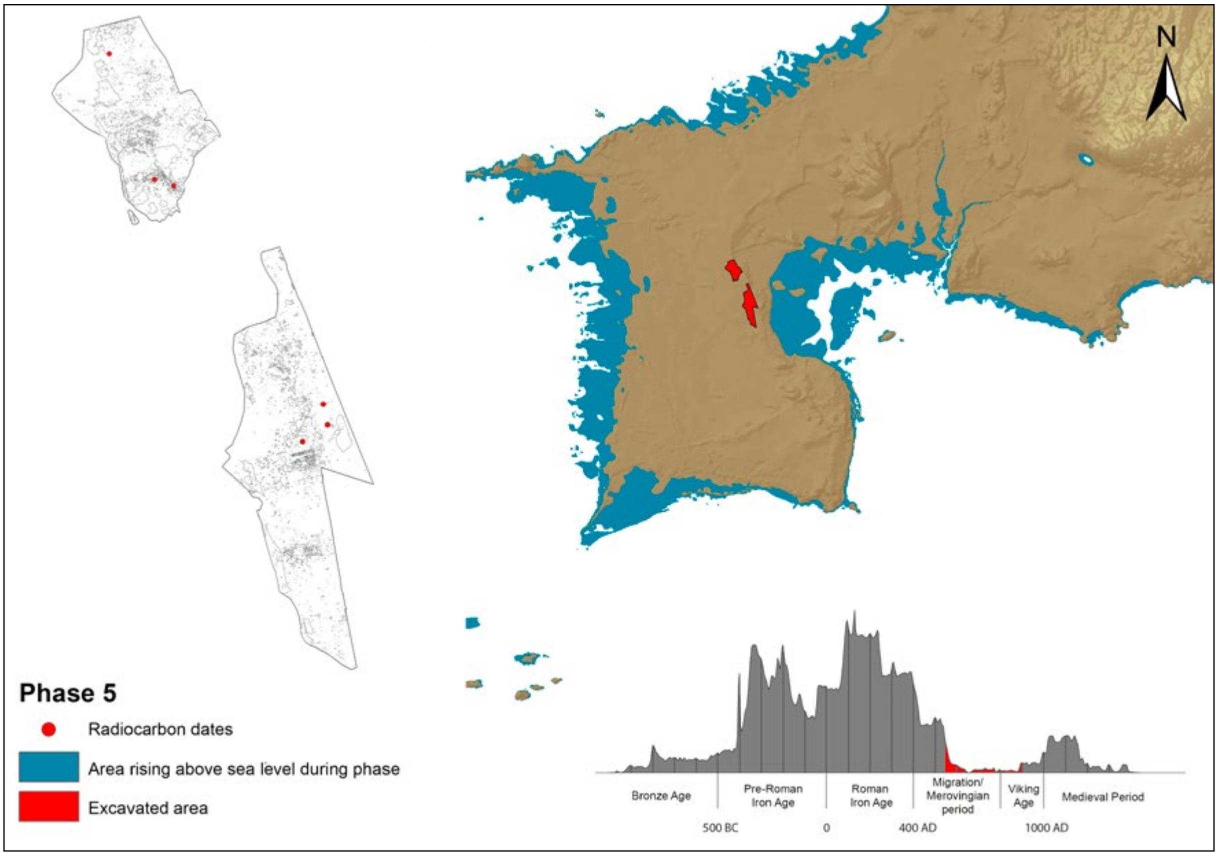

Figure 11. The shoreline at Ørland and dated features at Vik in Phase 5. Illustration: Magnar Mojaren Gran, NTNU University Museum.

are that settlement activity declined in Phase 4 compared to the previous period. Only one building was erected in Phase 4: House 25 in Field E. Around AD 550, settlement in Fields A, E and C was abandoned. Radiocarbon dates from the mid 6th century in Vik indicate a very rapid decline in settlement following the global climatic event in 536 (Büntgen et al. 2016). Pollen analysis of the Eidsvatnet sediment core, however, shows intensive agricultural activity in the region in the period before c. AD 550. This might indicate that the settlement recession registered in Vik during Phase 4 was a local phenomenon. On the other hand, the Eidsvatnet core showed that forests gained land at the transition to the Merovingian period, thus indicating that the setback commencing from c. AD 550 in Vik reflected a regional agricultural decline. In the Ryggamyra core, barley was registered in the Migration period, indicating that cultivation did take place in the vicinity. At the same time, lower charcoal values than before indicate that occupation was further away from the sample site than in previous phases. This could imply that some farms survived while others were abandoned in the Ryggamyra vicinity during Phase 4. Like the Eidsvatnet core, the Ryggamyra core showed that re-forestation occurred at the transition to the Merovingian period and Phase 5 (Overland & Hjelle 2017:56). This implies that

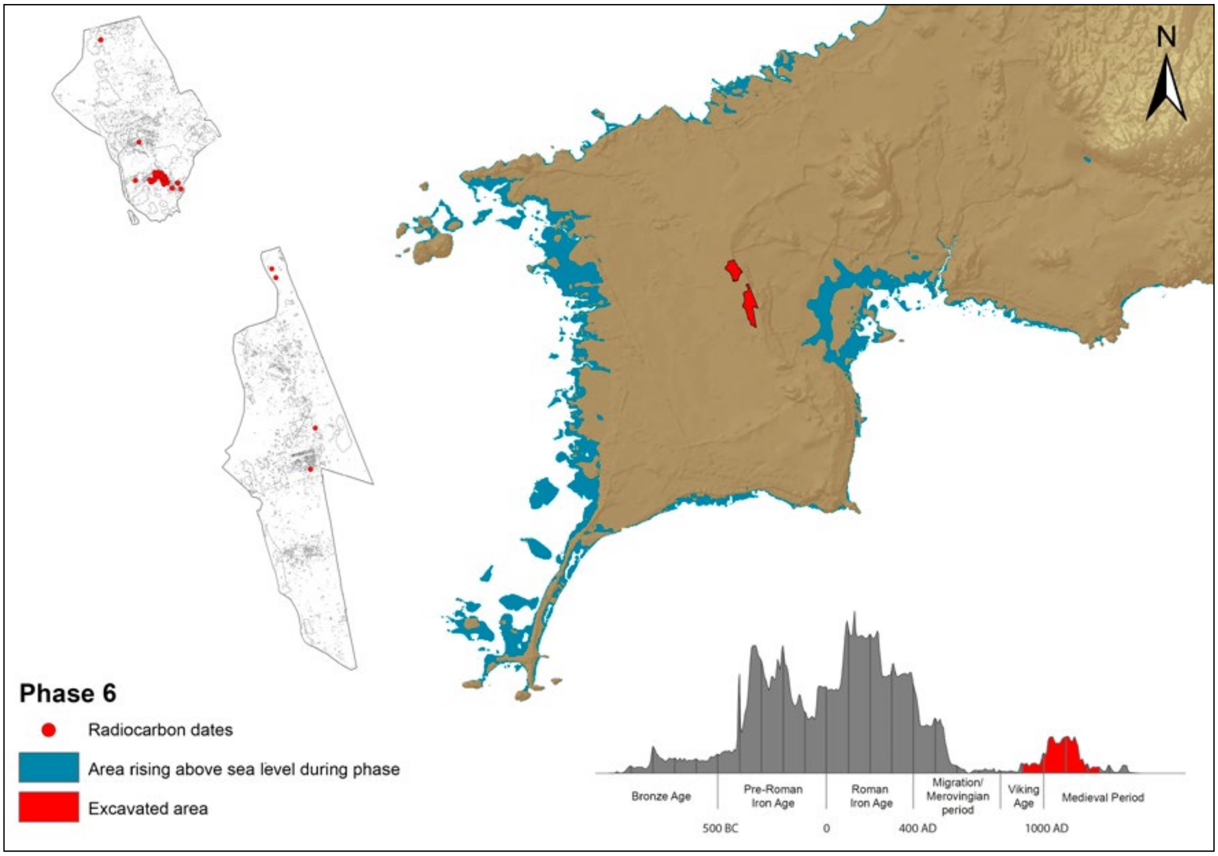

Figure 12. The shoreline at Ørland and dated features at Vik in Phase 6. Illustration: Magnar Mojaren Gran, NTNU University Museum.

the decline in agriculture around AD 550 was both a regional and a local phenomenon.

Phase 5 c. AD 550–900: Silence (Figure 11)

The transition to Phase 5 stands out in archaeological data from Vik as well as in pollen data. The sediment core from Eidsvatnet and the peat core from Ryggamyra both show forest re-growth, indicating low agricultural activity both on a regional and local level (Overland & Hjelle 2017:56). Almost no settlement activity has been recorded at Vik in the Merovingian period. Activity was still low in the early Viking period, even though a few features, such as cooking pits, postholes and ditches, all in Field E, were dated to this period. There were also a few indications of activity in the transition from the Migration period to the Merovingian period in Field C, but all in all the main impression of this period is of abandonment of all the settlements at Vik. Land upheaval changed the landscape profoundly from c. AD 550 to c. 900. The flat bottom of the previous bay rose above sea level, and the shore regressed by more than a kilometer from Vik. During this period, however, regression did not characterize all of Ørland. There was still settlement in nearby Hårberg (Birgisdottir & Rullestad 2010), as well as in Viklem (Berglund & Solem 2017). Also, a few graves, including graves containing weaponry, are known from the transition between the Migration and Merovingian periods at Røstad (B 1462-1463) and Opphaug (T14456, Ystgaard 2014).

Phase 6 c. AD 900–1250: A medieval farm in Field E (Figure 12)

After almost 400 years with very few signs of occupation, settlement activity showed up in Field E around AD 900. Before the decline around AD 550, this part of Vik was characterized by continuity in activity, represented mainly by cooking pits and agricultural and cultural layers, from the Pre-Roman Iron Age to the Migration period. Around AD 1000, after 400 years of abandonment, this area was chosen for the establishment of a new farm, with a longhouse (House 20), a pit house (House 40), three other buildings with possible dates to this period (Houses 5, 14 and 27), as well as three wells (Fransson Ch. 10, Randerz Ch. 11). During Phase 6, historic records show that a church was built at Vik, probably south of our excavation area (Brendalsmo 2001:291). There was also a church at nearby Viklem, as well as contemporaneous settlement traces (Brendalsmo 2001:289-291, Ellingsen & Sauvage Ch. 13).

Pollen analysis of the Eidsvatnet sediment core showed that forest growth continued from Phase 5, but around AD 1000 a significant de-forestation commenced while outfield grazing increased. The Ryggamyra peat core also showed forest growth until the early Viking Age, even though some barley pollen indicated agricultural activity in the vicinity. Increased cultural activity was indicated in the early and high medieval periods (Overland & Hjelle 2017:56-57).

Phases 7–9, c. AD 1250–present: Pasture, modern farms, air station

After the abandonment of the Field E farm c. AD 1250, there is some evidence of activity in a few pits with buried animals in Fields B and D, and pasture has been recognized in the pollen diagram from the Ryggamyra core as well as in pollen from archaeological features in Field A (Overland & Hjelle Ch. 3). No traces of buildings have been recognized from Phase 7 (c. AD 1250–1850). Four farms were established within the excavation area in the 1800s, during Phase 8 (c. AD 1850–1940, Rian 1988:235, 237, 240, 250-253). Prehistoric settlement traces in Fields A and E were partially damaged by two of these farms. From c. 1940, the farms were abandoned, and the airfield was established (Rian 1986, Hovd 2004). Military activity also affected settlement traces in Fields A and E.

DISCUSSION

Bronze Age pioneer visits

In the pioneer phase with non-permanent settlement traces at Vik (Phase 0, Figure 7), human activity was dictated by natural conditions, namely the accessibility of the land. The emergence of the Vik land ridge from the sea around 2600 BP was a prerequisite for human settlement. It is reasonable to assume that the first people to visit the ridge came from the higher, already inhabited land in the eastern part of Ørland, where Bronze Age farming took place (Henriksen 2014:174-175). A shallow bay separated the ridge from the land to the east. On quiet days, the ridge was probably accessible on foot, by walking and wading. A large stone cairn, called Nøkkelhaugen, on a then small island to the west of the newly exposed land ridge, has not been dated (Figure 2). Cairns of similar size and construction, which are found on prominent ridges in the landscape and/or are communicating towards nearby sea routes, have been dated to the Bronze Age (Grønnesby 2009, 2012). The cairn indicates that people frequented the shallow waters and the small islands at an early stage, and that the seaside landscape had both economic and ritual importance.

The shallow waters were not very suitable for fishing, but other marine resources such as shells and cockles were probably abundant. Moreover, the shallow water and the wide, tidal beach were rich in bird life. It is possible that the area was suitable for grazing before people found it safe to establish their own homes on the exposed land. This would suggest that foraging, fishing and herding were early activities on the newly exposed ridge. The very earliest activity concentrated on Mølnhaugen, which possibly gave some shelter.

Settling new land in the Pre-Roman Iron Age: Patterns of land-use organization

During the first phases of more permanent settlement at Vik (Phases 1 and 2, c. 800–50 BC, Figures 7 and 8), land-use transformed from a mobile to a more permanent pattern. All eight concentrations of activity traces at Vik are dated to Phases 1 and 2.

All eight activity concentrations contained Phase 1 and 2 cooking pits, while only four had recorded traces of Phase 1 and 2 buildings. There are a number of possible reasons why only cooking pits and no buildings were preserved in four out of eight activity concentrations. One explanation could be lack of representation. In the central part of Fields A/E, subsoil conditions with coarse and gravelly sand with rocks, as well as modern disturbance, made any house remains almost impossible to distinguish. In the southern part of Field E, modern disturbance had left settlement traces damaged, and no Phase 2 buildings were identified. Still, detailed analysis of cultivation layers and cultural layers indicated permanent pre-Roman Iron Age farm occupation nearby (Macphail 2017, Fransson Ch. 5, Linderholm et al. Ch. 4). In the central part of Field D, a number of cooking pits indicated activity in Phase 2, while none of the eight buildings recorded were dated earlier than Phase 3. Modern agricultural activity and erosion had left the cooking pits and postholes in the area very shallow. This might imply that traces of Phase 2 buildings were simply not preserved, assuming they were shallower than the Phase 3 buildings. In the southernmost part of Field D, the group of cooking pits dated to Phase 2 probably represented the outskirts of a settlement area which extended to the east and out of the excavation area. If so, it is possible that Phase 2 buildings are preserved outside of the excavation area. All in all, lack of representation does not fully explain the absence of buildings in these four concentrations. However, negative evidence must be treated with caution.

Another explanation why only cooking pits were preserved in four out of eight activity concentrations could be that cooking pits could actually occur without any connection to contemporary buildings. According to Maria Petersson, pre-Roman Iron Age cooking pits with no connection to buildings in Västra Östergötland might be associated with animal herding (Petersson 2006:169). This explanation could fit the Vik material well. A theory of animal herding dominating in the pre-Roman Iron Age is not contradicted by palaeobotanical data, which does indeed indicate animal herding during this period (Overland & Hjelle Ch. 3). Interestingly, permanent settlement with houses followed in two of the Phase 2 cooking pit areas in the later Phase 3 – in the central part of Field A and E, and in the central part of Field D. This could imply that earlier herding traditions had significance when later permanent settlement was established.

The areas between the eight Phase 1 and 2 activity concentrations mostly showed few traces of activity. No fences or demarcations between the concentrations were identified. In the excavation area north of Mølnhaugen (Fields A and E), no traces of activity have been found in the area between the two northernmost concentrations, and this is striking. No obvious natural cause for the lack of activity traces was observed, as there was no difference in elevation or subsoil composition. However, natural preconditions distinguished a demarcation zone between the two southernmost settlement concentrations in Fields A and E. Here, there was a distinctly lower and more moist area, with a modern day drainage ditch. Between Fields E and B, Mølnhaugen formed a natural barrier. In the area between the settlement concentrations in Fields B and C, a possible natural barrier could also be discerned. Here, the ground was marginally lower – only about 0.1-0.2 meters, but enough to cause the ground to be slightly more moist (Fransson 2018b). On the other hand, there was no apparent reason why there were no settlement traces between Fields C and D. The elevation of the landscape and the composition of the subsoil were very similar in the areas with archaeological features and the areas without such features.

Thus, natural conditions in the shape of lower-lying and more moist areas, or in the shape of the hillock Mølnhaugen, did separate some of the Phase 1 and 2 activity concentrations. However, there were also empty areas between activity concentrations that were just as well suited for occupation as the settled areas. This indicates that the relatively equal distances between the settlement concentrations were not exclusively caused by natural conditions. Instead, cultural conceptions probably also dictated the distance between settlements during the pre-Roman Iron Age. The indications are that farmsteads at Vik in the pre-Roman Iron Age “wandered” (Ystgaard Ch. 12, with references). The two northernmost activity concentrations in Field A, concentrating on House 9 and House 1 respectively, were not occupied simultaneously. House 1 was probably abandoned before c. 400 BC, while House 9 was probably not erected before c. 250 BC (Fransson Ch. 5, Ystgaard Ch. 12). Provided people still remembered the location of the previous House 1, the distance between the two farmsteads could indicate the distance required between an earlier occupied farmstead and the location for the new farmstead concentration on House 9.

A general trait of pre-Roman Iron Age land-use in Scandinavia is that buildings usually lasted one generation, and that new buildings were rarely built on the remains of older ones. Instead, new buildings were often moved to a new location, on pristine land (Gerritsen 1999, Myhre 2002, Løken 2006, Grønnesby 2013, Bukkemoen 2015, Gjerpe 2017). Central Norwegian material does not contradict this general impression. In Torgård and Kvennild near Trondheim, Bronze and pre-Roman Iron Age settlement concentrated on a relatively limited space, but no buildings overlapped (Grønnesby 2013:84). In the later part of the pre-Roman Iron Age, this pattern changed towards more stable settlements (Gjerpe 2017:151). At Hovde in Ørland, c. 3 km south of the excavation area at Vik, a Late Pre-Roman Iron Age fenced farm has been examined. Early Roman Iron Age buildings were placed on top of the remains of Late Pre-Roman Iron Age buildings, signifying a different attitude towards older buildings, which could now be removed, with new buildings being erected in the same spot (Grønnesby 1999).

A similar pattern occurs in Field B at Vik. From around 400 BC settlement concentrated in Field B, and several buildings succeeded each other in the same concentration over the next c. 300 years. Some of the buildings were possibly occupied simultaneously (Fransson Ch. 5). This indicates that an intensification of settlement took place in Field B during the pre-Roman Iron Age. This occurred simultaneously with wandering settlements and extensive herding activity, as recorded in Fields A, E, C and D.

During the pre-Roman Iron Age, therefore, the narrow Vik peninsula was an area of quite intensive human activity, but with ever-changing patterns of land use organization. Wandering settlements, probably with an emphasis on animal herding, dominated in Fields A, E, B and D. At the same time, in Field B, settlement was concentrated on one spot for a longer period of time. In the long run, this preceded a disruption of the earlier, mobile land-use organization.

Roman Iron Age concentration and intensification

Occupation in Phase 3 (c. 50 BC–AD 350, Figure 9) was found in the same areas of activity concentrations as in Phase 2. In Phase 3, however, activity was concentrated in five of the eight previous concentrations. The northernmost concentration on House 9 in Field A possibly continued into Phase 3, but this settlement extended to the north and out of the excavation area and was therefore not fully excavated. The southern part of Field E was occupied in Phases 3 and 4, but only one Phase 4 building (House 25) was identified, possibly because of modern disturbance. This leaves us with three areas with major concentrations of Phase 3 settlement remains: one concentration in the central part of Fields A and E, one in the central part of Field C, and one in the central part of Field D. The continuity in the use of space between Phases 2 and 3 indicates that some of the cultural preconditions behind the Phase 2 land use organization were still at play in Phase 3.

Phase 3 farmsteads were more intensively used than the Phase 2 farmsteads. As a rule, two buildings were occupied at the same time, and substantial waste deposits accumulated in two of the Phase 3 farmsteads. Abandoned Phase 3 buildings were replaced by new buildings nearby. Generally, Phase 3 gave an impression of more concentrated and intensified settlement than Phase 2. Radiocarbon dates from postholes and cooking pits do not increase markedly from Phase 2 to 3 (Figure 4). However, more buildings were in use simultaneously in Fields A/E, C and D in phase 3. The stable number of radiocarbon dates from postholes and cooking pits is partially a result of a more strict sampling policy in Fields C and D than in Field B (Ystgaard et al., 2018). Also, radiocarbon dates from other features, mainly waste deposits and hearths, increase in number from Phase 2 to 3 (Figure 4). This indicates increased activity connected to each house, and possibly an increased number of inhabitants in each house (cf. Myhre 2002:159, Herschend 2009:242).

Landscape changes from Phase 2 to 3 meant that more land became available. The new land was, however, most likely marshy and not suitable for crop cultivation (Berger 2001:121). Instead, new land possibly meant more grazing land and thereby larger herds of animals. Evidence of storage of manure in the large waste deposits in Field A might support the idea of larger herds, and greater efforts in fertilizing and soil improvement (Macphail 2016). There are no major changes in the pollen data regarding vegetation from Phase 2 to 3. The lack of evidence of change in the vegetation between the two periods could mean that the concentration and intensification of the settlement pattern at Vik from Phase 2 to 3 relied on an organizational and cultural background, rather than on natural preconditions. At the same time, the steadily increasing amount of land also could have had an effect on the size of the herds, and thus the availability of manure for the barley fields. This might have been of great importance to the intensification of settlement and increase in population witnessed during Phase 3.

The Great Decline: Migration period settlement decrease and Merovingian Period abandonment

While settlement activity at Vik reached a peak in Phase 3, the overall sum of radiocarbon dates indicates that stagnation and a decrease in activity occurred as early as AD 250 (Figure 4). However, building activity did not decrease until Phase 4. The possible decline starting c. AD 250 could therefore be a question of change of use of the waste deposits.

The use of buildings declined from c. AD 350–400, during the period when the northernmost activity area around House 9 in Field A and the large settlement concentration in the central part of Field D were abandoned (Heen Pettersen & Lorentzen Ch. 6). Settlement continued in the central part of Fields A and E, in the southern part of Field E, and in the central part of Field C. In both Fields A and C settlement moved slightly towards the north, while it became less intensive than in the previous phase. Buildings erected in Field C in the last part of Phase 3 continued in use into Phase 4, but no new buildings were erected in Field C in Phase 4. The only building erected in phase 4 was House 25 in Field E. Towards the end of this phase, activity in all three concentrations ceased. Cooking pit activity, on the other hand, remained relatively stable in Phase 4 (Figure 4).

No major changes occurred in land upheaval or vegetation cover during this period. The bay to the east of the settlement was probably still accessible, although it was getting very shallow. Pollen diagrams from both Eidsvatnet and Ryggamyra indicate that settlement, agriculture and pasture in Ørland and Bjugn continued throughout Phase 4, and did not cease until the transition to Phase 5. Still, the Ryggamyra core indicates that settlement in Phase 4 was located further from the pollen sample site than in previous phases. This could imply that some of the settlements close to Ryggamyra were abandoned during this phase. An interpretation of the decline at Vik in Phase 4 could be that the intensification in Phase 3 went too far, and that the land available could not sustain the presumably high population of people and animals, even taking the available marine resources into account. Local environmental and archaeological data cannot fully support this hypothesis. However, compilations of tree-ring data, sea surface temperatures and rising lake levels imply a colder and wetter period in Scandinavia from AD 480-540 (B. E. Berglund 2003). This has also been registered in tree-ring data from Jämtland (Linderholm & Gunnarson 2005). Climatic variations such as these had consequences for the length of the growing season and the cultivation of barley (Stamnes 2016).

Regional and local environmental causes of the diminishing settlement at Vik during Phase 4 are still hard to pinpoint. Cultural explanations of the reduced settlement activity should therefore also be sought. The economic system of the Western Roman Empire had significant impact on the barbarian hinterland and the Scandinavian societies. The collapse of this economy had, amongst other things, the effect of stopping the flow of prestigious objects, which were important as elite symbols in the increasingly stratified Scandinavian societies. Trading opportunities also diminished, leaving a decline in income from trade in iron and probably other products exported from Scandinavian societies to continental Europe and the Roman Empire (Lund Hansen 1987, Hedeager 1992, Solberg 2000, Herschend 2009, Stenvik 2015). Warfare and raiding emanating from Scandinavia and directed towards continental Europe ceased, because opportunities to win goods in conflict collapsed with the withdrawal of the Roman army from the Limes region (Hedeager & Kristiansen 1985, Herschend 2009:359, Ystgaard 2014:259). These developments probably had over-reaching effects on economy, trade, production and warfare in Scandinavian societies. Imported drinking glass, and glass and amber beads from Phases 3 and 4 at Vik, indicate that the Vik farms, which were probably not of the highest social standing, still had contacts which made the acquisition of imported goods possible (Ystgaard Ch. 12). Changes in economic, cultural and political connections could represent changes in the connections, and thus the power base, of people at Vik, and leave them in a difficult situation. Elsewhere in central Norway, elites probably lost external contacts and opportunities for external acquisition – important spurces of power and prestige in local communities (Herschend 2009, Ystgaard 2014). A setback in communications, warfare and trade could, in turn, lead to a decline in population. A settlement decline can be observed during this period in several areas in Scandinavia, and in several cases it commenced as early as c. AD 200 (Myhre 2002:105, Gundersen 2016, Gjerpe 2017:194-197, Løken in press, chapters 16 and 17).

In Phase 5 (c. AD 550 – 900, Figure 13), settlement at Vik was as good as completely abandoned. Pollen diagrams indicate re-forestation both regionally and locally in Phase 5. Land upheaval caused the bay to dry out, and the seashore receded relatively rapidly from the Vik ridge. With the drying bay, suitable boat landing areas moved further away from the settlement area. The earlier strategic advantages of Vik's location were diminished, and this coincided with the abandonment of the settlement at Vik. The drying out of the bay might therefore serve as a local, environmental explanation why settlement ceased in Phase 5. However, the decline seemingly started well before the bay went completely dry. Also, settlement decline in the 6th and 7th century is recognized in several regions of Scandinavia and northern Europe, and this widespread phenomenon has been tied to a major change in the global environmental – the Late Antique Little Ice Age, caused by a volcanic eruption in AD 536 (Gräslund & Price 2012, Büntgen et al. 2016). However, the AD 536 volcanic eruption in itself cannot explain the decline in the settlement at Vik. First, the decline started as early as the 4th century. Second, the land upheaval and the extinction of the local bay must have had significance for the local course of events. Altogether, explanations of the decline in the Vik settlements should be sought both in natural and cultural processes, with both over-regional, regional and local effects over a period from c. AD 350 to AD 900.

Re-settlement: Late Viking Age and early medieval period

Vik was almost completely abandoned for nearly four centuries. The dry bay and the reduced strategic qualities of the site might explain why it took this long before the site was re-settled (Fransson, Ch. 10). Pollen diagrams show new agricultural activity from the Late Viking Age. Associated with the Late Viking Age / early medieval period farm in Field E was an open environment with herb-rich grasslands and cultivated fields. Heathlands had developed in the vicinity, probably reflecting outfield grazing (Overland & Hjelle Ch. 3).

Knowledge of non-urban settlement from this period in central Norway is so far relatively limited, and there is not much comparable material relating to farm layout and organization of land use (B. Berglund 2003, cf. Martens 2009). However, evidence of Late Viking Age and medieval period settlement is increasing (Sauvage & Mokkelbost 2016). Comparing all available evidence, the main impression is that the Field E farm was of modest social standing, not least in comparison with the possible hall buildings excavated at nearby Viklem (Fransson, Ch. 10, Ellingsen & Sauvage Ch. 13).

Modern day continuity in land use organization?

The location of the Phase 2 settlement concentrations and their Phase 3, 4 and 6 successors on the Vik ridge allowed each farmstead access to arable land on the top of the ridge. In addition, one might suggest that the location of the farmsteads on top of the ridge also gave each farmstead access to the marsh areas to the east and the west of the ridge, perhaps all the way to the constantly withdrawing beach zones on each side. Parts of the marshes and the beach zones were probably valuable grazing areas.

Archaeological and written sources relating to the settlement at Vik are very scarce in Phase 7 (c. 1250 – 1850, Sandnes 1971:31-34, Bjørkvik

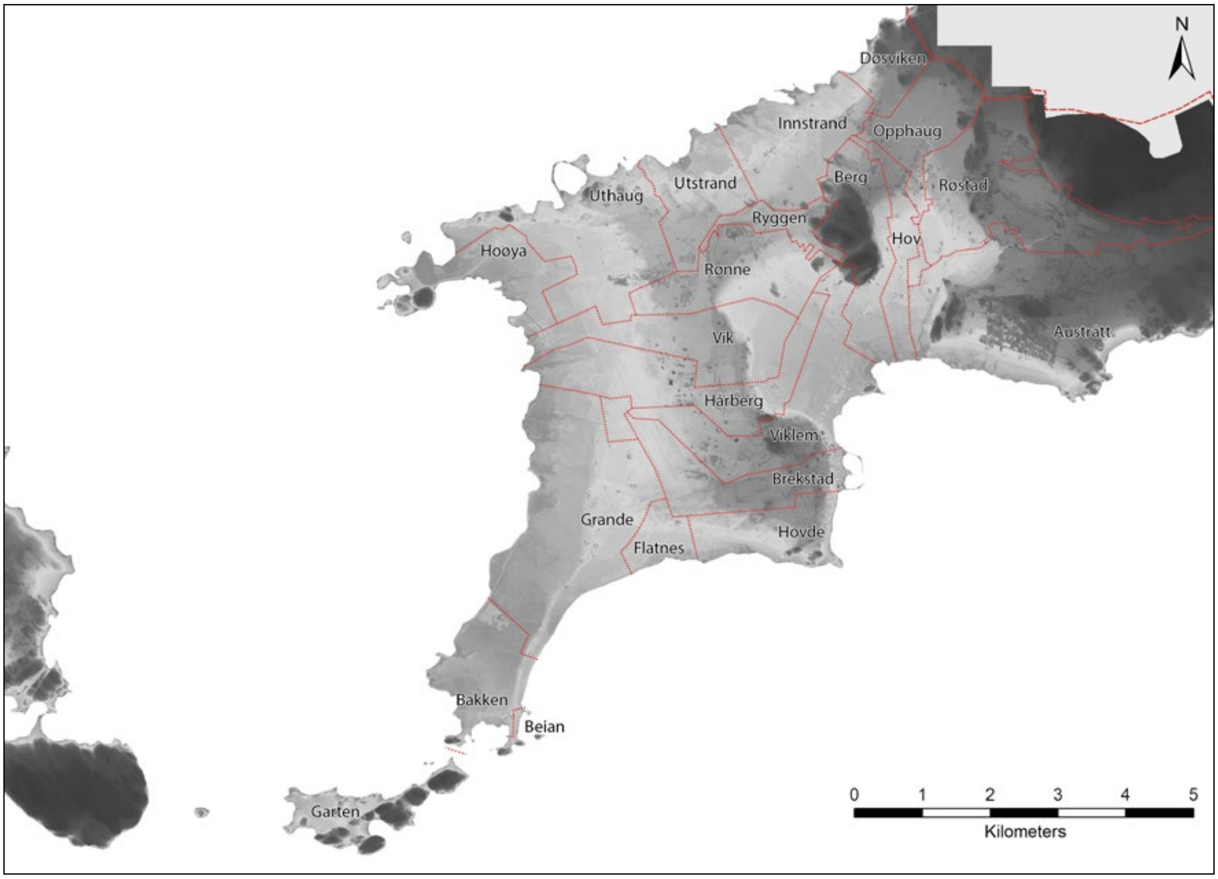

Figure 13. Farm boundaries in Ørland from 1874. The background map shows the topography. Illustration: Magnar Mojaren Gran, NTNU University Museum.

1975:8-9). During this phase, however, large estates were formed, centering on manors in Austrått and Storfosna. Vik belonged to the Austrått estate in the 17th century (Bjørkvik 1975:42). Some estates in Hordaland have been proven to date back to the Late Iron Age (Iversen 2008). The map recording the re-division of land at Vik in 1874 in order to assemble smaller farm plots into larger areas could, with reservations, reflect historical principles (Figure 13). The 1874 farm boundaries show that the farms along the main ridge in Ørland, namely Rønne, Vik, Hårberg, Viklem, and Brekstad, were all concentrated, with their farm buildings, on the ridge. At the same time, outland areas to the east and the west were secured for each farm. Two of the farms, Vik and Hårberg, extended to the western shore. 19th century Vik farmers traditionally led their herds to pasture at Djupdalen, directly to the west of the farm (Berger 2001:121).

CONCLUSION

Environmental changes affected the accessibility of the land in the first two phases of occupation at Vik, c. 1100–400 BC (Phases 0 and 1). Storm surge and sea spray hindered permanent settlement on the low land, but cooking pits and evidence of other activity show that the new land was of interest to people living nearby. The newly exposed ridge was probably used for foraging, fishing, hunting and perhaps herding. Around 400 BC, the new land became suitable for more permanent occupation, and animal husbandry and agriculture made a severe impact on the local vegetation (Phase 2). Cooking pits dominated in all eight settlement concentrations in Phase 2, while buildings were recorded in only four of the concentrations. Cooking pits were possibly associated with herding, and buildings in this phase were erected on pristine land and occupied for a short period of time, signifying a mobile settlement pattern. At the same time, a more permanent settlement pattern was established in one location, namely Field B. An even more stable and concentrated settlement pattern emerged in Phase 3. Settlement intensified in three simultaneously occupied farmsteads in Fields A/E, C and D. Concentration and intensification of the settlement in Phase 3 coincided with new available grazing areas as a consequence of land upheaval, but explanations of the settlement intensification should also be sought in contemporary social and cultural developments. Commencing from c. AD 200, settlement at Vik started to decline. The farmstead in Field D was abandoned by c. AD 350 (Phase 4). By c. AD 550, all Roman Iron Age farms had dwindled (Phase 5). At this point, the local bay had dried out completely, and Vik had lost its strategic position. This might serve as a local explanation of the decline and abandonment, although the bay did not seem to be extinct at the time when the decline started. It is tempting to look for earlier causes of decline by taking a broader perspective. Cultural and social developments connected to the fall of the Western Roman Empire were probably at play during the start of the decline at Vik. The global event of the AD 536 dust veil must have made a huge and possibly final impact on the already dwindling settlement. After more than four centuries, one of the farm sites was re-settled and a modest farm existed between AD 950–1250.

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