

Farms abandonment in Iceland

Introduction

The medieval abandonment of upland farms represents one of the most investigated phenomena in Middle-Age Iceland (centuries 9th-12th). This paper aims to explore the causes of such a process by taking into consideration both historical sources and material evidence from different places in Iceland. It primarily seeks to better frame the impact of natural hazards such as avalanches and landslides and suggests some potential new approaches to the investigation of resilience and vulnerability of upland farms in medieval Iceland.

HISTORY

The Norse colonisation of Iceland (Landnám) was a rapid process. Archaeological evidence demonstrates that the first human settlement on the island began around A.D. 874, allegedly when the Norwegian hero Ingólfr Arnarson founded the town of Reykjavík.

The first wave of Norse settlers selectively occupied sheltered areas near Iceland's coast and in major fluvial basins in order to gain access to grazing areas in coastal lowlands and to exploit significant marine and freshwater resources and. Only later they started to move into the highlands regions (Roy et al., 2018).

GEOGRAPHY

Iceland is a geologically and geomorphologically active island whose landscape is the result of glacial, volcanic, and tectonic processes; moreover wind, fluvial, and slope processes combine to produce very dynamic landscapes (Lebrun et al., 2023). The island owes its existence and geological processes to a large volcanic fissure along the Mid-Atlantic Ridge, where the Eurasian and



Fig. 1
Map of Iceland highlighting its geological features
(<https://www.exploratorium.edu/>)

American tectonic plates meet. Moreover, its position in the North Atlantic region explains an important role in the environmental changes that the landscape underwent during the Holocene, because of frequent anomalies and variations (Fig.1).

Mountains and highlands in Iceland make up about half of the land area of the country. Glaciers and volcanoes are also considered part of Iceland highlands, thus making most of the island “uninhabitable”. However, archaeological finds shows that, at least during the beginning of the settlement of Iceland, farms were built in these areas too.

In particular, slope processes are strongly connected with climate changes and extreme meteorological events. In Iceland these extreme meteorological events come in the shape of rapid snowmelt, heavy snow accumulation and storms and have been identified as triggering factors for debris flows and snow avalanches (Lebrun et al., 2023). The subsequent colluvial deposits can be considered as proxy for extreme meteorological events. The same cataclysms have a major impact on the landscape and can be a major threat to human settlements.

Materials and Methods

To explore why the phenomenon of farm abandonment was so widespread in Icelandic highlands both historical texts, in particular sagas and annals and the environmental history of the sites, were taken into account.

Considering the celebrated realism that surrounds Icelandic sagas, one would easily think to find numerous references to the hazards to which Iceland is subjected. Some volcanic activities are indeed recorded in the *Landnámabók*, the Book of Settlements written between the 9th and the 10th century, but only rarely these events are put in relationship with human settlements. In total, only four settlers’ stories show volcanic eruption (Falk, 2007). These rare pieces attest more the interest of medieval Icelandic historians in discovering the origin behind place names, building of farmsteads and topographic features (Falk, 2007). The other main narrative genre is that of the sagas of the Icelanders. However, strangely the *Íslendingasögur* (family sagas) don’t mention explicitly natural hazards. For example, only four episodes of avalanches or landslides were recorded in these sources. Different scholars have noted how these sagas rarely describe natural calamities; on the other hand, other types of disasters such as shipwrecks, are more commonly reported (Falk, 2007; Barraclough 2012).

The slope process described in the *Sturlunga* saga, one of the family sagas, apparently took the lives of five people. Since then, until the present day, approximately 680 casualties derived from slope process events have been documented, for sure a huge number for such a small population (Lebrun et al., 2023).

It is from the 13th century, when annals started to be kept to record important historical events, that hazards are more regularly attested. Annals also mention events that happened before the 13th century, even if it is not sure what source did the historians used for their meteorological data. The most comprehensive annals are the *Annales Regii* and the *Skálholts Annals*, which cover the period 1300 – 1356 (the latter, unfortunately, do not cover the years

1013-1180). All the annals mention in fact different natural catastrophes, such as earthquakes, landslides and volcanic eruptions (McCreesh, 2018).

Then a combined study of the sites and different soil was done. In this part of the study tephrochronology played an important role to determine the date of abandonment of farms. Tephrochronology is a dating method first applied by Sigurdur Thorarinsson, based on the identification, correlation and dating of tephra layers. Because of the large number of severe volcanic eruptions that took place in Iceland, past studies could establish a detailed chronology of pre-occupational and post-occupational archaeological events in the island based on such volcanic markers (Thorarinsson, 1981).

On the mount Þórsmörk, in southern Iceland, at least five farms have been discovered (Vésteinsson, 1998; Dugmore et al., 2009). Only one of those, Husadalur, escaped erosion; the other four were subjected to frost action, deflation and water erosion. These processes have exposed different artefacts dated between the 9th and the 12th century, suggesting that the farms were abandoned around the 12th century. The site was later reoccupied during the 19th century. The combined study of the tephra and field layers successfully dated the environmental changes that happened on the mountain ridge. These episodes of landscape instability probably happened between the 10th and the 13th centuries, with localised episodes of soil erosion to the bedrock that ended before AD 1300 (Dugmore et al., 2009).

Mount Flautafell, in north-east Iceland, has three main farms built on its slope (Lebrun J. et al., 2023). In this site five tephra layers were identified, the more recent being the one caused by the Veiðivötn eruption in 1477. Furthermore, one of these layers was disturbed by either cryogenic or slope process, or by a combination of the two. Landforms typically associated with landslide



Fig. 2
Aerial picture of the western part of Mt. Flautafell. Farm ruins and snow avalanches landforms are visible.
(Lebrun et al., 2023)

and snow avalanches are clearly visible on the mountain slope, making possible that slope processes happened on at least two of the three considered farms (Lebrun et al., 2023) (Fig.2).

A peculiar event happened on the mount Langholt, in northern Iceland (Bolender Douglas, et al., 2011). Here two farms, Stóra-Seyla and Glaumbær, were first built on the lowland at the foot of the mountain, but were relocated on a higher location during the 11th century. The former was then inhabited until the 20th century, while the latter was definitively abandoned around the 10th century. Farm relocation was a pretty common practice when a farm was hit by a disaster; we can find another example in the site of Myrkárdalur, a farm situated in the highland that was partially destroyed by a landslide in the 14th century, and thus moved further west (Harrison, 2011). Both farms show evidence of localised environmental change. In particular at Stóra-Seyla excavations showed rapid soil accumulation after the deposition of the Hekla tephra - dating to CE 1104, which could have been caused by soil erosion. However, no evidence of natural hazards had been found at Glaumbær (Bolender Douglas, et al., 2011).

In the inland there's little presence of human activity. An example can be the site of Pálstóftum, that sadly lies within an area submerged after the completion of a hydroelectric dam (Lucas et al., 2007; Lárusdóttir, 2019). However, the climate of internal Iceland is more hostile than that of coastal areas and the majority of the land corresponds with volcanoes and glaciers.

Discussion

Multiple scholars have studied and confirmed the extreme human impact on soil, vegetation and therefore landscape in the first period of the Norse settlement. It has been estimated that about 90% of the forest and 40% of the soil present in the 9th century had disappeared (McGovern et al., 2007). Of course, the highlands experienced instability too. Can we say that these environmental changes were the cause of farm abandonment? In some cases archaeological evidence suggests this it was the case. In other cases, evidence is less straightforward: for example if we take into consideration the farms of mounts Þórsmörk and Flautafell we can assume that either human impact and natural processes concurred to erosion and landslides, or a combination of the two, after which the farms were abandoned (Dugmore et al., 2009; Lebrun et al., 2023).

The examples of the Langholt region are, however, different. A possible explanation that was given for this action was a change in the social pattern. Many relocated sites are known to have Christian churches that were not present in the original site (Bolender Douglas, et al., 2011). This association raises the general question of whether the farm relocation reflected a need to distance the newly Christian households from the association with pagan ritual practices. Yet it has to be mentioned that there are some farms that were built before the official conversion to Christianity, and that didn't relocate after establishing a church (Bolender Douglas, et al., 2011).

Farms in the inner regions were often built on volcanic slopes or on glaciers covering active volcanoes. This would cause, if not the absolute destruction of the farm, at least that the farm was partially hit by the eruptions. The presence of farms in such a dangerous environment

suggests that the first settlers weren't familiar with a similar landscape and were therefore underestimating the geo-tectonic hazard of the island.

Conclusions

After analysing abandoned Norse farms located in the Icelandic highlands and the possible reasons behind their abandonment, we can conclude that, even if environmental change played an important role in the phenomenon, it was not the only one. Other important factors came into play, such as human induced degradation and social and cultural dynamics.

To find a more clear answer further researches are needed. I think more archaeological researches are needed, to have a more general view of the phenomenon; furthermore possible new discoveries could be compared with previous ones to find potential similarities or differences. Moreover, I would suggest to deepen the study of Norse practices in Iceland, to better understand how much it could have caused environmental changes.

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