# Database on Icelandic Holocene tephra layers
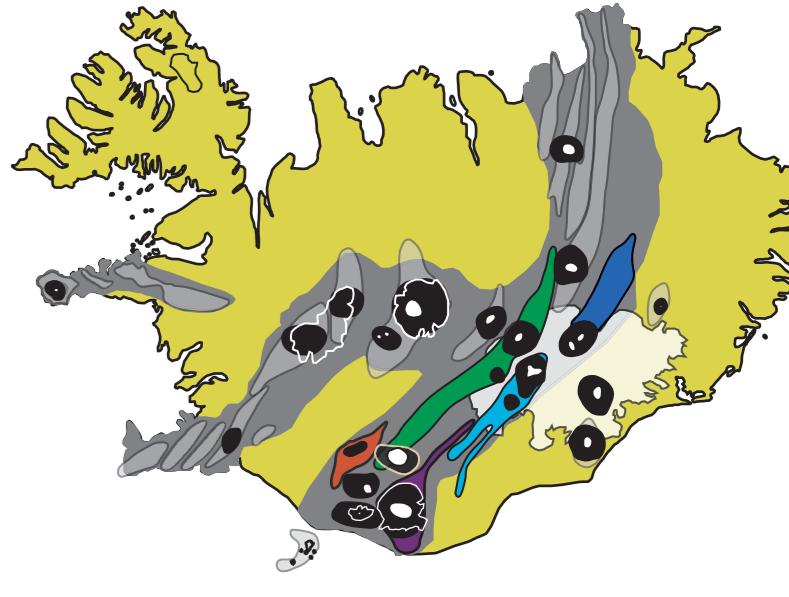
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Introduction

Volcanoes in Iceland erupt on average every 3-5 years, of which two-thirds are explosive events. Only about ¼ of the total number of explosive events is represented in the tephra record in Iceland as the majority of tephra layers produced is too small to be conserved. Nevertheless, Iceland is by far the main tephra producer in the Northern Atlantic region and Icelandic tephra is widespread over North Europe and Greenland.

A data base of Holocene tephra in Iceland will, therefore, be a great asset for all studies using Icelandic tephra, such as volcanology, petrology, geochemistry, archaeology, climate studies etc. Due to the high frequency of tephra forming eruptions in Iceland such data base will contain a large part of Icelandic Holocene eruptions. The data base focuses on number, origin, chemical composition, volume and dispersal of Holocene tephra layers.
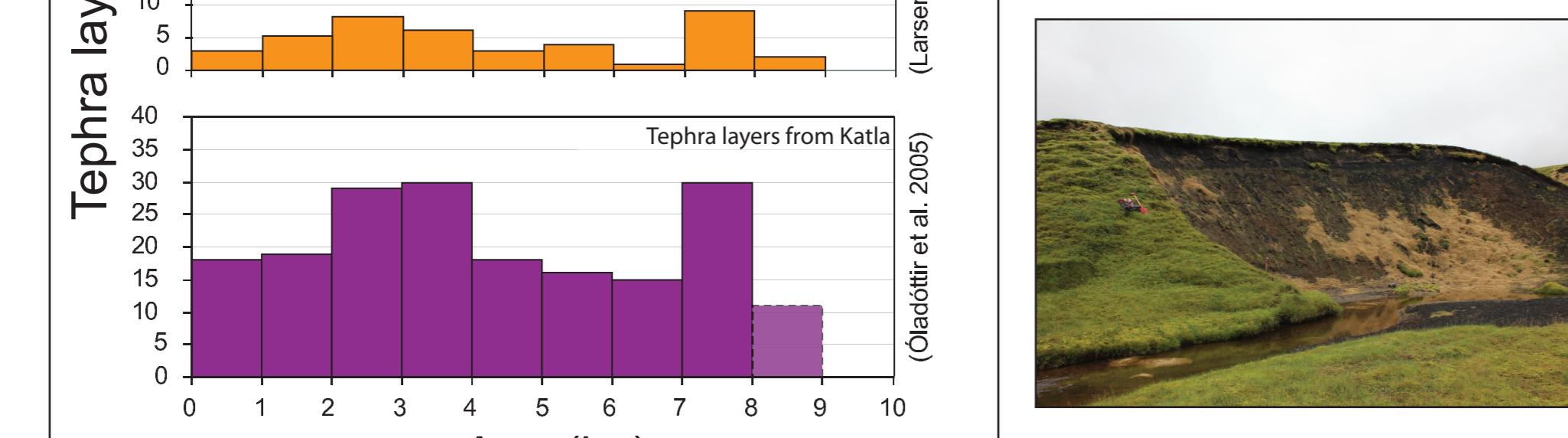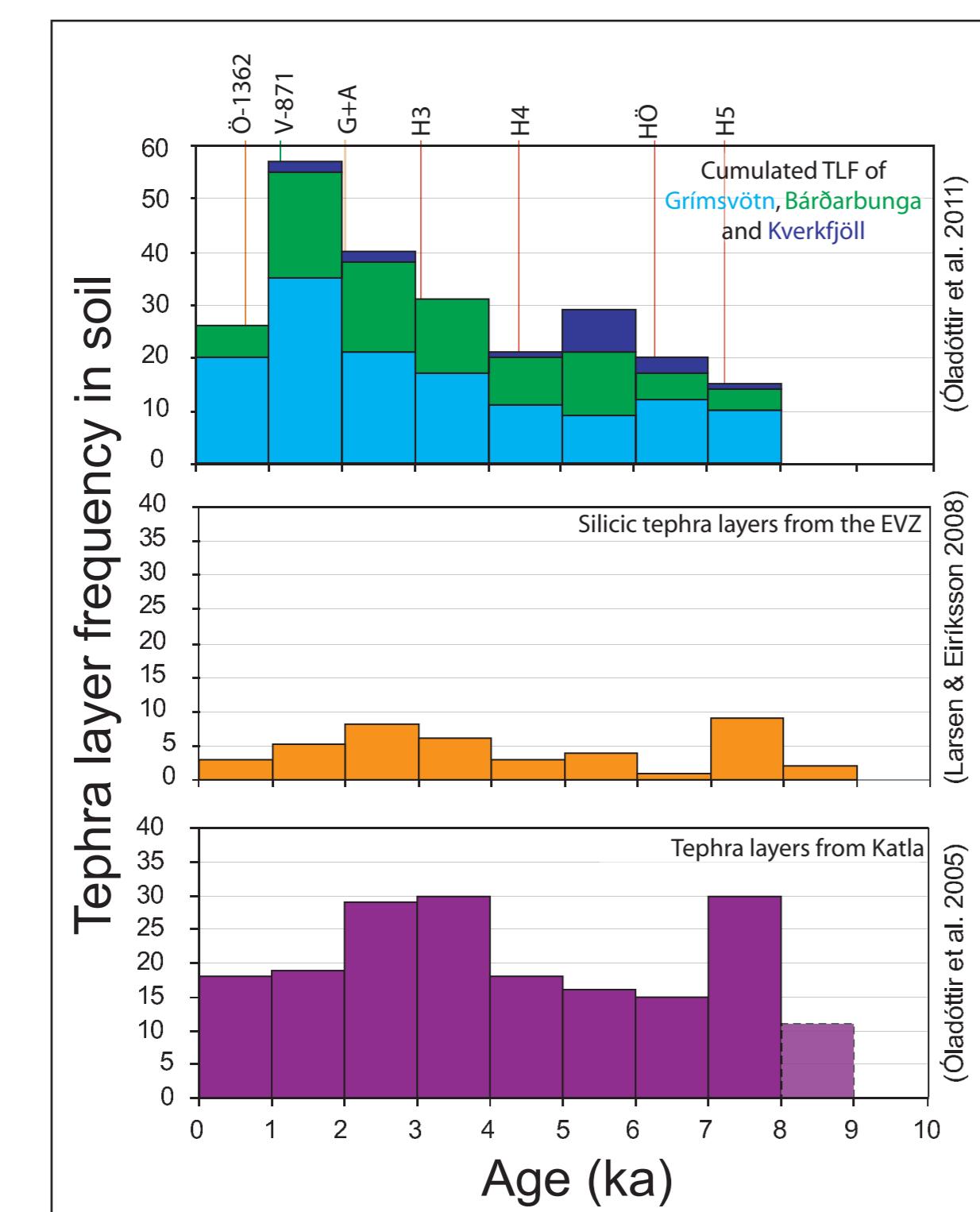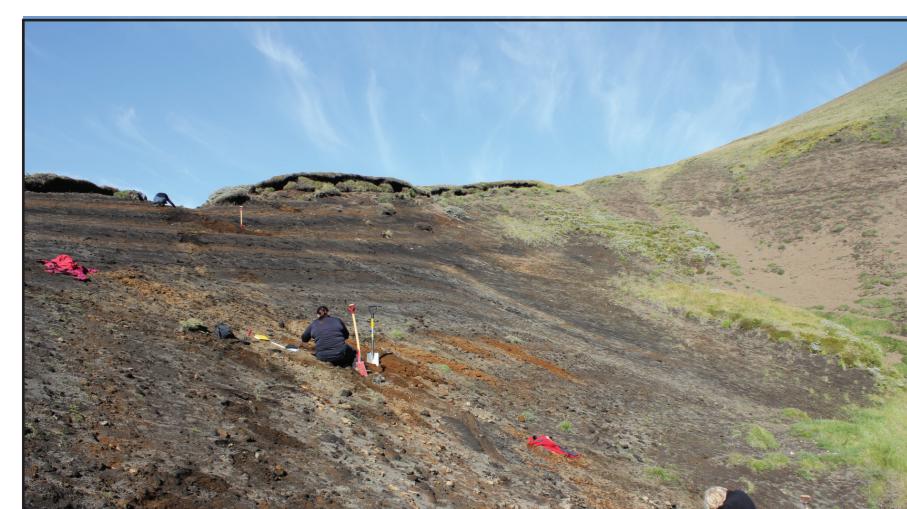
Questions addressed by the database

1) What tephra layers are found in different locations?
2) What is the main dispersal axe of each tephra layer?
3) Is tephra dispersal variable in time?
4) Have prevailing wind directions changed with time?
5) Are eruption frequency and tephra layer volume correlated?
6) What chemical range is known for individual tephra layers?
7) Is there a correlation between volume of tephra layers and their chemical composition, and if so, can it possibly be related to magma chamber behaviour, or even deeper-seated processes?

The tephra base will also make the following aspects more accessible:

1) Chemical characteristics of tephra from different volcanic systems.
2) Correlation between tephra layers in soil outcrops and between different environments.
3) Tephra marker layers, both local and regional, their age and dispersal.
4) Identification of basaltic tephra layers or series of layers applicable as marker layers.
5) Finding tephra of specific age from selected volcanic systems.
6) Dispersal of tephra layers and associated isopach maps.
7) Volume calculation of thoroughly mapped and measured tephra layers.

Icelandic Holocene Tephra Layer Database - Construction

Timeline

2009-June 2014	June 2014	July-August 2014		October 2014
Design	Data Input	Testing	Corrections	Final Product

2014-Future

Maintanence and public use

Data base will be left with the Nordic volcanological centre
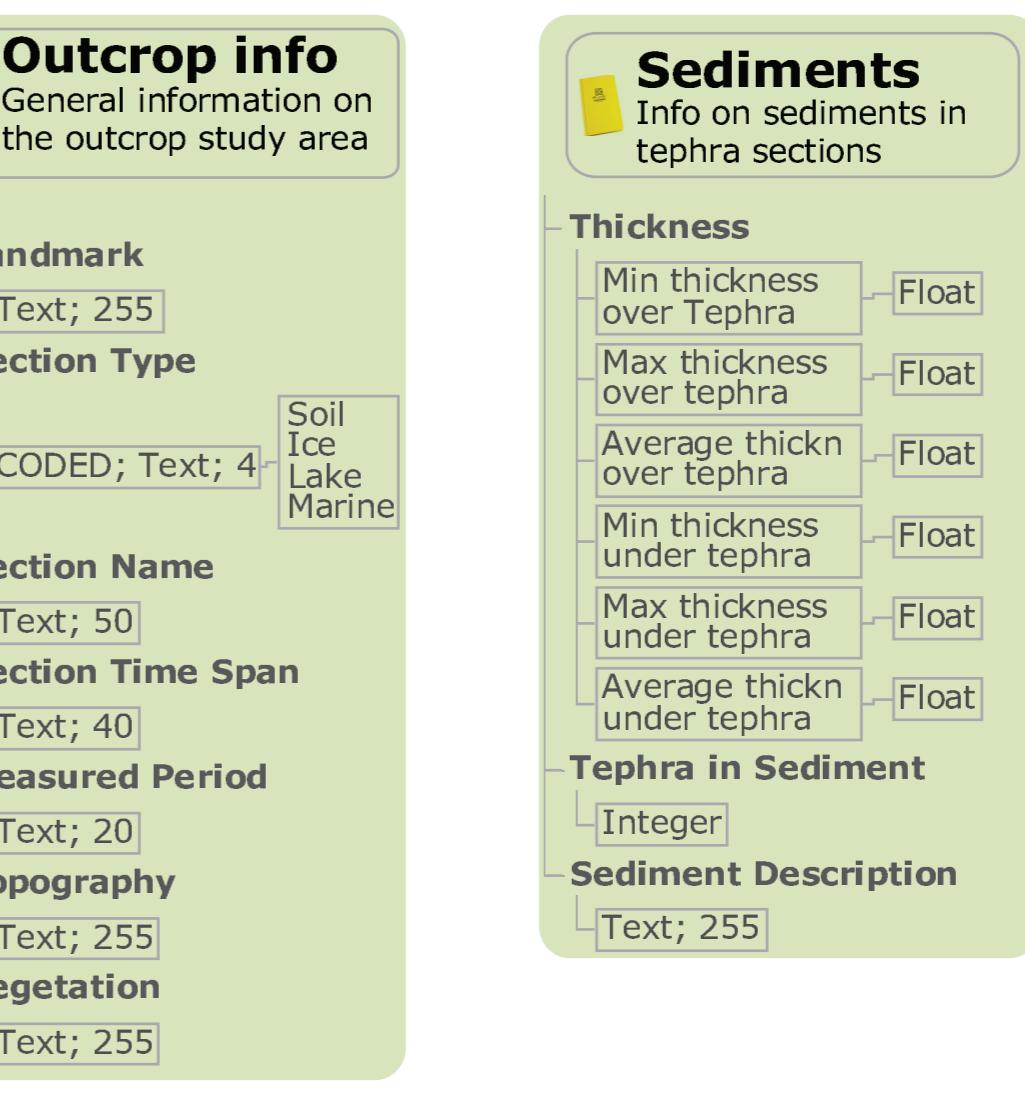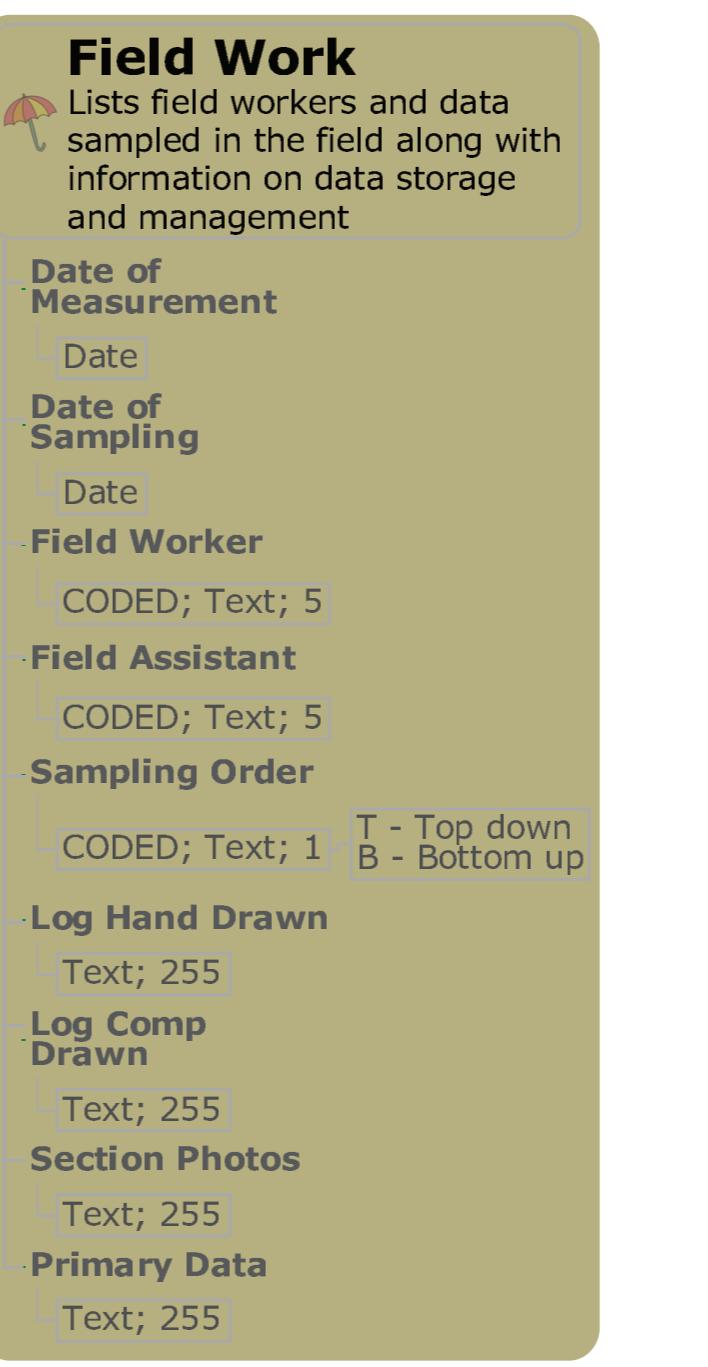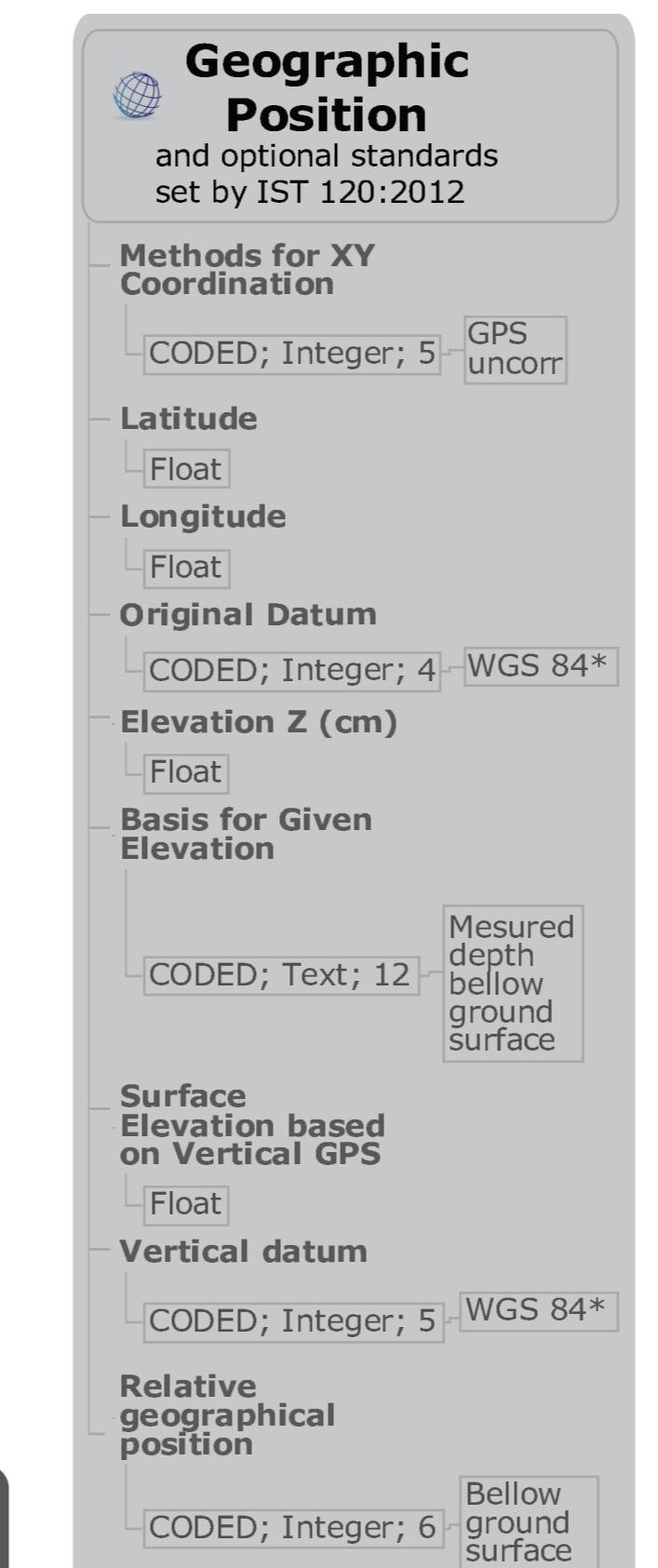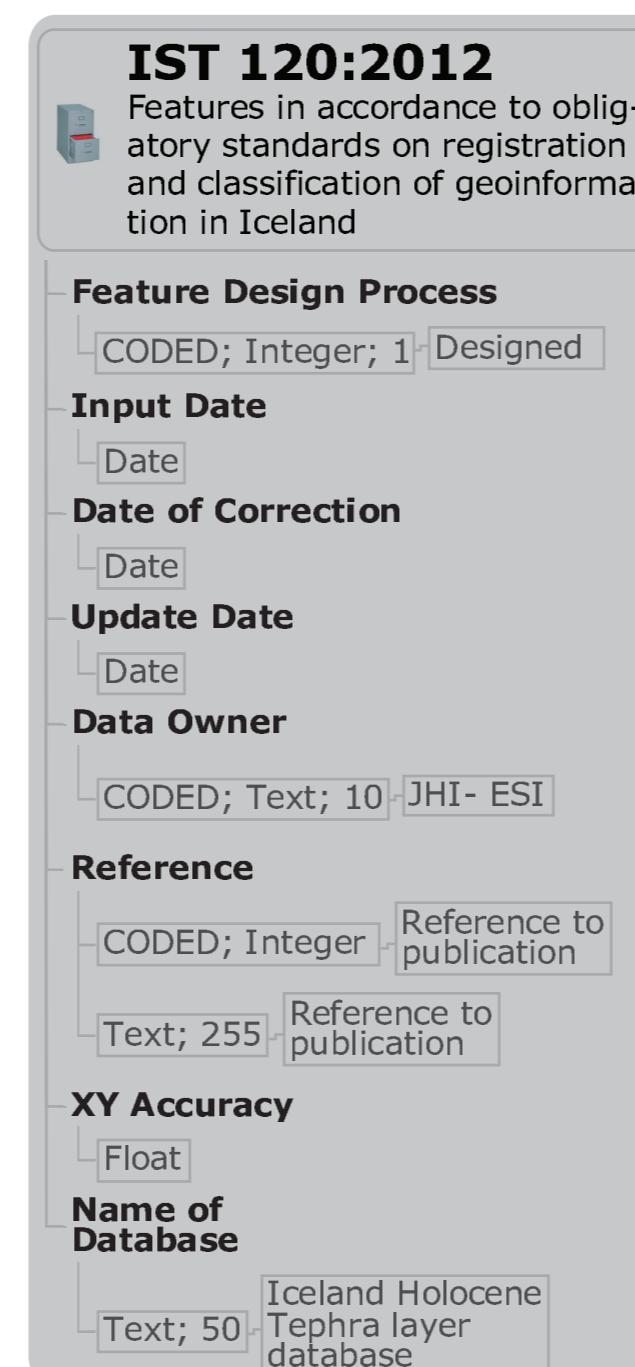
Examples of data in database
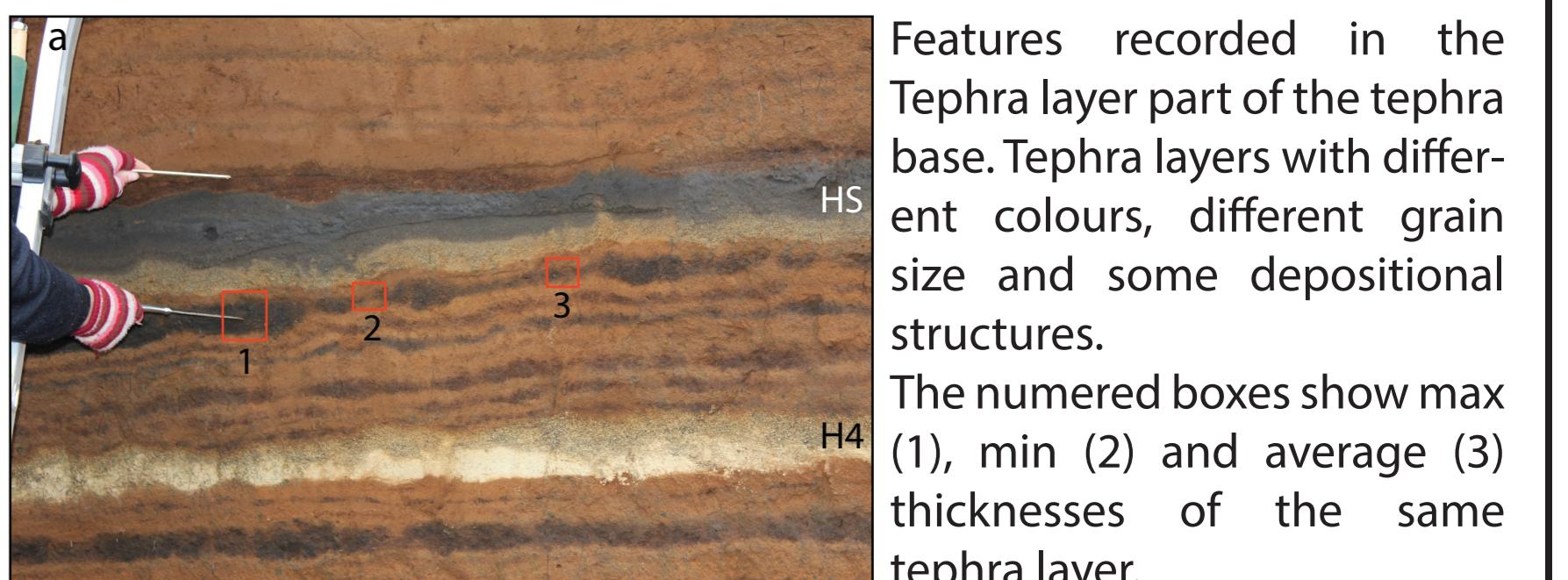
Features recorded in the Tephra layer part of the tephra base. Tephra layers with different colours, different grain size and some depositional structures.
The numbered boxes show max (1), min (2) and average (3) thicknesses of the same tephra layer.
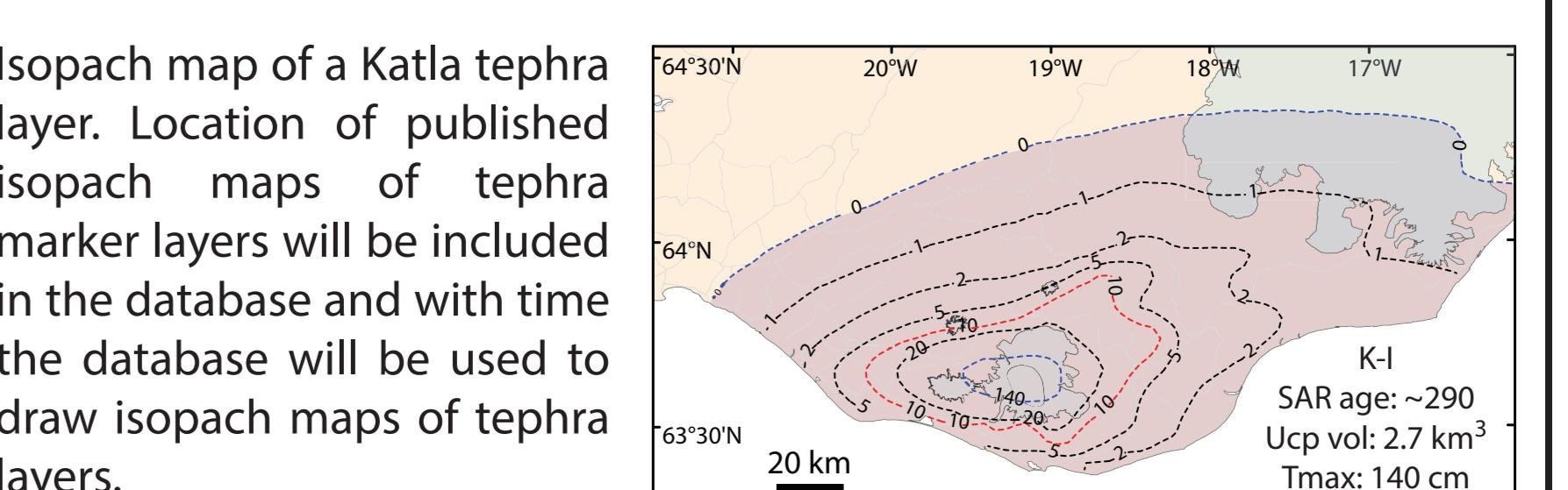
Isopach map of a Katla tephra layer. Location of published isopach maps of tephra marker layers will be included in the database and with time the database will be used to draw isopach maps of tephra layers.

Aims

By constantly adding data to the data base (previously published and new data) the tephra base will considerably improve access to current knowledge on Icelandic tephra layers and aid long term research goals such as the estimation of magma productivity of the Icelandic volcanic systems and volcanic zones through the Holocene.