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2019

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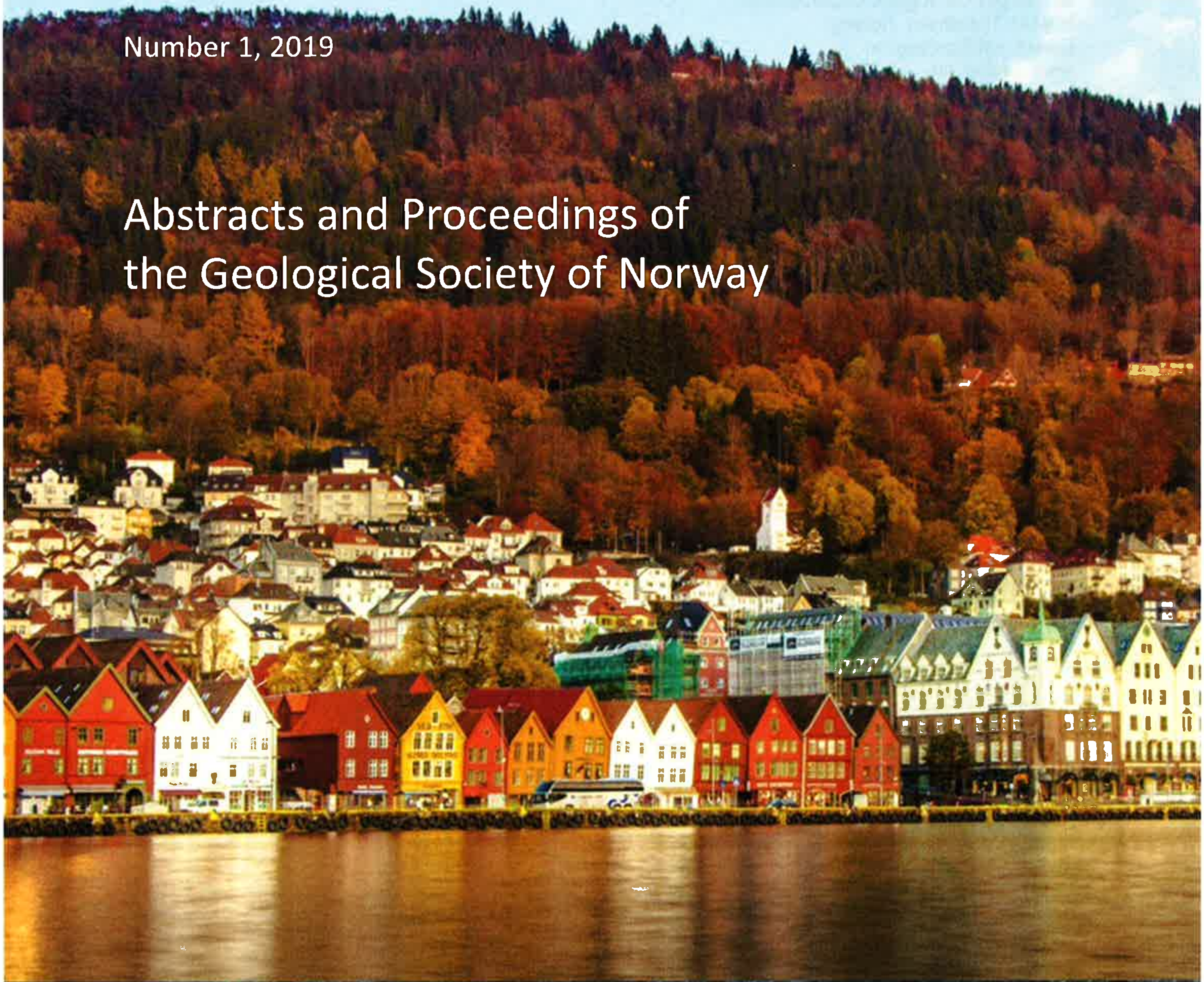

Number 1, 2019

Abstracts and Proceedings of the Geological Society of Norway

Edited by:
Hans Arne Nakrem and Ann Mari Husås

www.geologi.no

NORSK GEOLOGISK FORENING

ISBN: 978-82-8347-041-3

NGF Abstracts and Proceedings
NGF Abstracts and Proceedings was first published in 2001. The objective of this series is to generate a common publishing channel of all scientific meetings held in Norway with a geological content.

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Published by:
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GEOLOGICAL SOCIETY
OF NORWAY

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Vinterkonferansen 2019

Bergen, January 7th-9th, 2019

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carbonates, indicating fluid circulation of carbonates in fold hinges during deformation.

Stable isotope geochemistry of the stratiform iron Dunderlandsdalen deposits, Nordland

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The Dunderlandsdalen iron district hosts a world-class stratiform iron mineralization. The iron ore units belong to the Ørtfjell Group in the Ramnåli Nappe of Caledonian Uppermost Allochthonous. The immediate host rocks of the mineralization are hundred meters thick dolomitic and calcitic marble that occur in intercalation with various mica schists. The ore-bearing sequence was deposited in Neoproterozoic times, at ca. 800–730 Ma (Melezhik et al., 2015). The principal ore minerals are hematite and magnetite, associated with minor amounts of pyrite, pyrrhotite and chalcopyrite. Carbonates, quartz, garnets and minerals from the epidote group are the most common gangue minerals. Ore bodies and their host rocks of the Dunderlandsdalen Fe district were exposed to deformation processes, recrystallization and remobilization of metals during the cycle of metamorphism and tectonic transport caused by the Caledonian Orogeny.

Stable isotope analyses ($\delta^{13}C$ and $\delta^{18}O$) were performed on host rocks as well as on different generations of gangue carbonates from the Dunderlandsdalen Fe district. The isotopic composition of the host marble ($\delta^{13}C$=4.5 to 4.7‰ V-PDB; $\delta^{18}O$=25.7 to 25.9‰ V-SMOW) overlaps with values characteristic for typical marine carbonates, indicating that the original isotopic signal has not been significantly changed during the recrystallization processes. In contrast, $\delta^{13}C$ and $\delta^{18}O$-values of calcite from foliation-parallel (S_0 and S_0/S_1) quartz-carbonate layers as well as of rhodochrosite and calcite from F1-fold limbs, ranged from -0.3 to -2.0‰ and 16.5 to 19.2‰ respectively, suggesting deposition under a strong influence of hydrothermal fluids. Carbonates taken from F1-fold hinges are significantly depleted in ^{13}C and ^{18}O ($\delta^{13}C$= -6.6 to -8.2‰; $\delta^{18}O$: 17.3 to 17.7‰) reflecting the fluid circulation and remobilization of carbonates in fold hinges during deformation processes. In addition, the mixed isotopic signature ($\delta^{13}C$=-1.1 to -0.9‰; $\delta^{18}O$=20.5‰) of post-deformational (possibly post-Caledonian extensional) quartz-carbonate veins may represent remobilization of previously existing carbonates in the study area.

Melezhik, V.A., et al. (2015) Pre-Sturtian (800–730 Ma) depositional age of carbonates in sedimentary sequences hosting stratiform iron ores in the Uppermost Allochthon of the Norwegian Caledonides: A chemostratigraphic approach. Precambrian Research, 261, 272-299.

In situ ^{10}Be surface exposure ages from the inner part of Sunnmøre

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In addition to characteristic large-scale landforms, such as the strandflat along the coast and fjords with intervening block-field mantled summits, Møre og Romsdal is characterised by a multitude of glacial, periglacial and paraglacial landforms, as well as numerous rock-avalanche deposits. This study presents new ages of glacial landforms in the inner part of Sunnmøre that have been dated using *in situ* cosmogenic ^{10}Be.

^{10}Be is produced in quartz exposed at the earth's surface by interaction between the mineral and secondary cosmic ray particles. The concentration of ^{10}Be in a rock surface allows calculation of the duration of subaerial exposure. ^{10}Be is a radioactive nuclide with a half-life of 1.36 Ma; the concentration of ^{10}Be is not a 'signal' that can be reset, and hence removal of ^{10}Be from the surface of a landform requires long durations of burial (complete shielding), or by erosion and re-moulding of the rock surface itself. Depending on pre- and post-exposure processes, exposure dating with cosmogenic nuclides can result in too young, too old or close to true ages.

In this study, targets for surface exposure dating using *in situ* ^{10}Be are boulders on moraine ridges formed by both local and regional glaciation, boulders on bedrock outside and inside of the Younger Dryas ice sheet margin, and glacially eroded bedrock surfaces at higher elevations. We present new ^{10}Be ages from sites located within (Gråsteindalen, Norddal, Tafjord), as well as north (Valldal, Alnesdalen (Rauma, Romsdal)) of the West Norwegian Fjords World Heritage Area. The data will be discussed with respect to i) post-exposure processes that affect surface exposure dating with cosmogenic nuclides (glacial rebound, snow shielding and erosion), and ii) deglaciation chronology.