

The Siberian Traps magma emplacement dynamics links to environmental changes across the Permian-Triassic boundary in Svalbard

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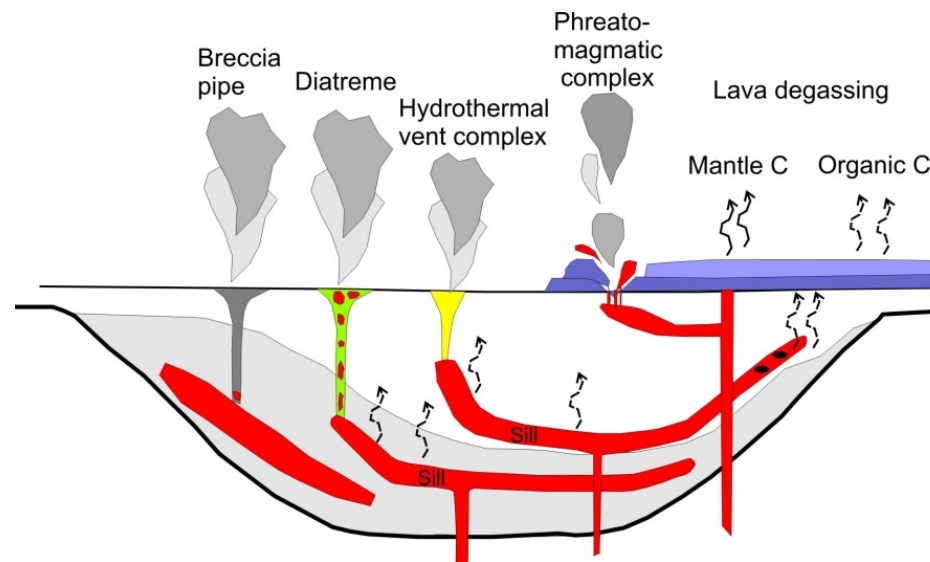
Initiation of Siberian Traps: subaerial volcanism in a wet forest environment

Deltadalen borehole across the Permian-Triassic boundary in Svalbard

Conclusions

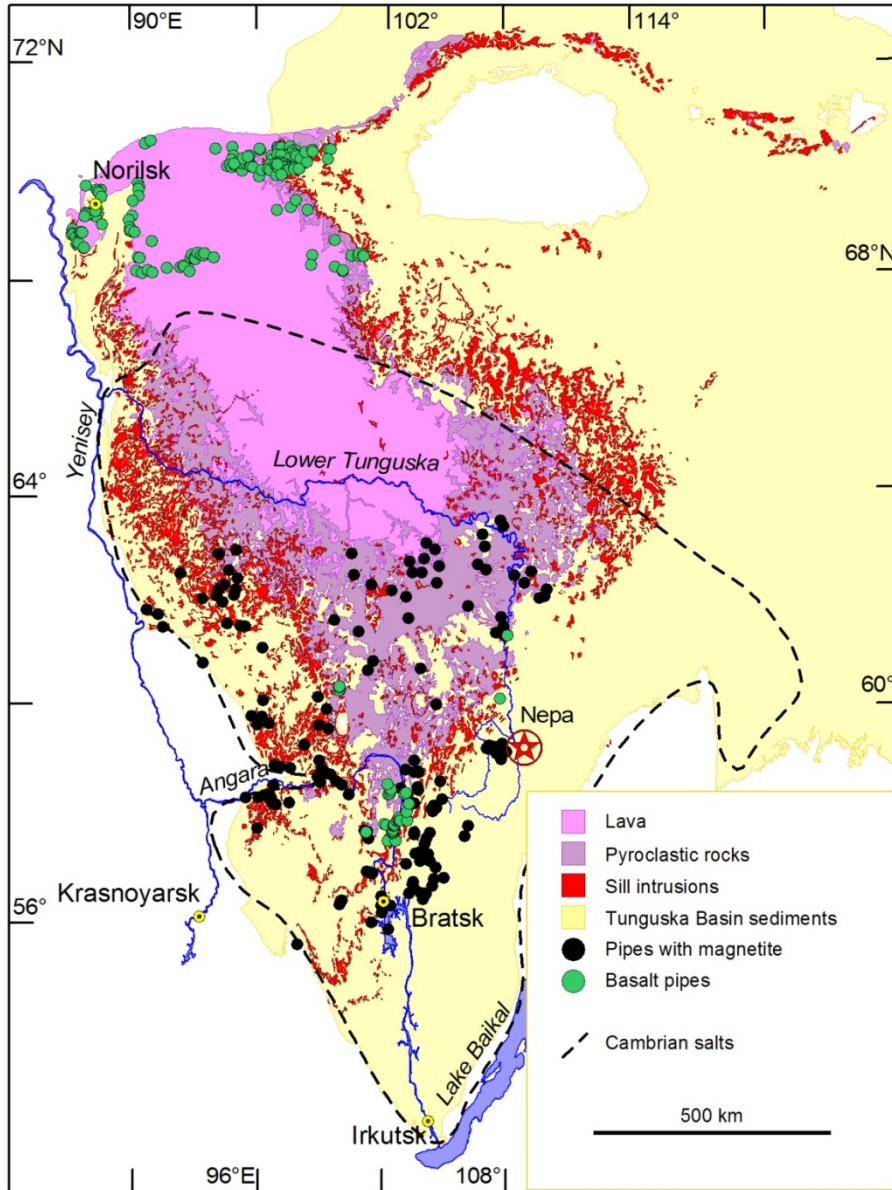
The **Permian–Triassic extinction event** formed the boundary between the Permian and Triassic geologic periods, as well as between the Paleozoic and Mesozoic eras, approximately 252 million years ago.

It is the Earth's most severe known extinction event, with up to 96% of all marine species and 70% of terrestrial vertebrate species becoming extinct.



Siberian Traps LIP

- Sediment degassing
- Magma degassing
- Tuffs



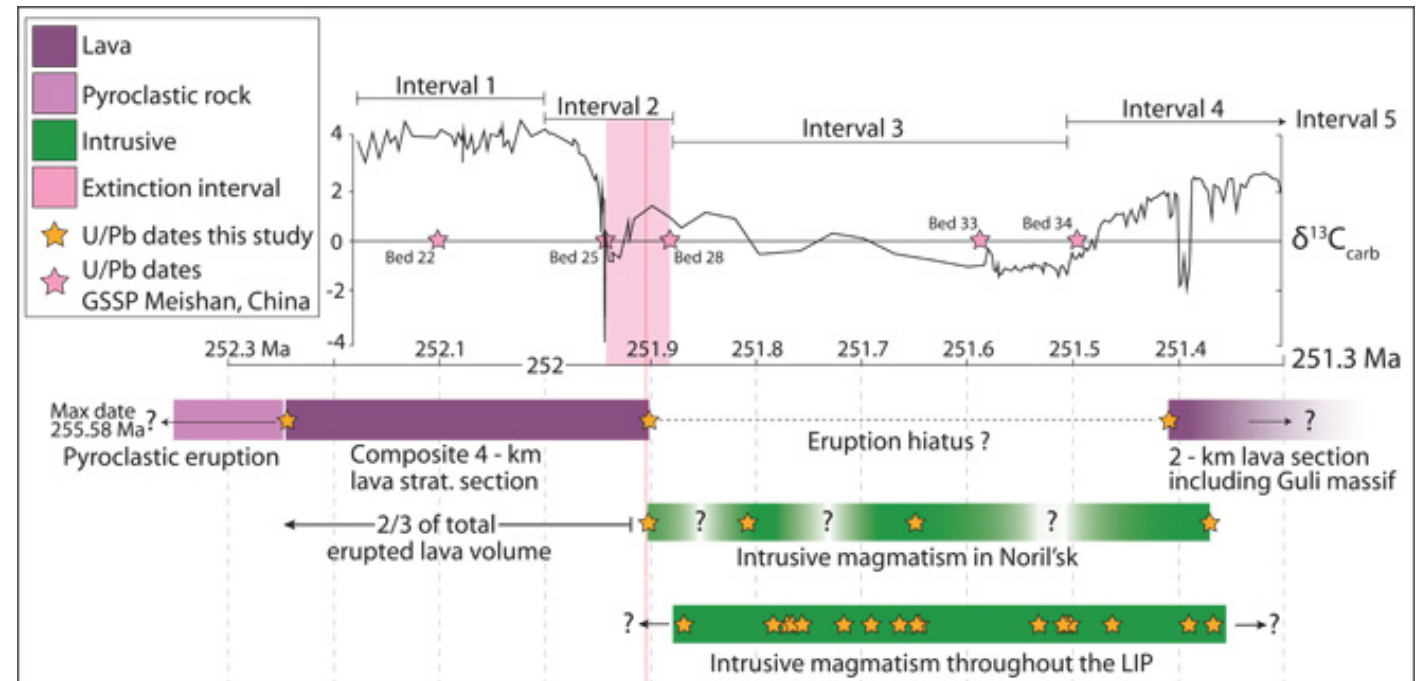
Age: ca. 252 Ma – duration of <1 Ma

Size: Max. 4 mill. km² with lava. Up to 6 km thick

Sills: Abundant subvolcanic intrusions. Up to 250 meter thick

Sediments: Pre-cambrian to Permian age carbonates, evaporites, clastic sediments, and coal

Pipes: Phreatomagmatic origin, heating of evaporites by magma



East Siberia



Putorana Plateau, Siberia: Layered Basalt Flows

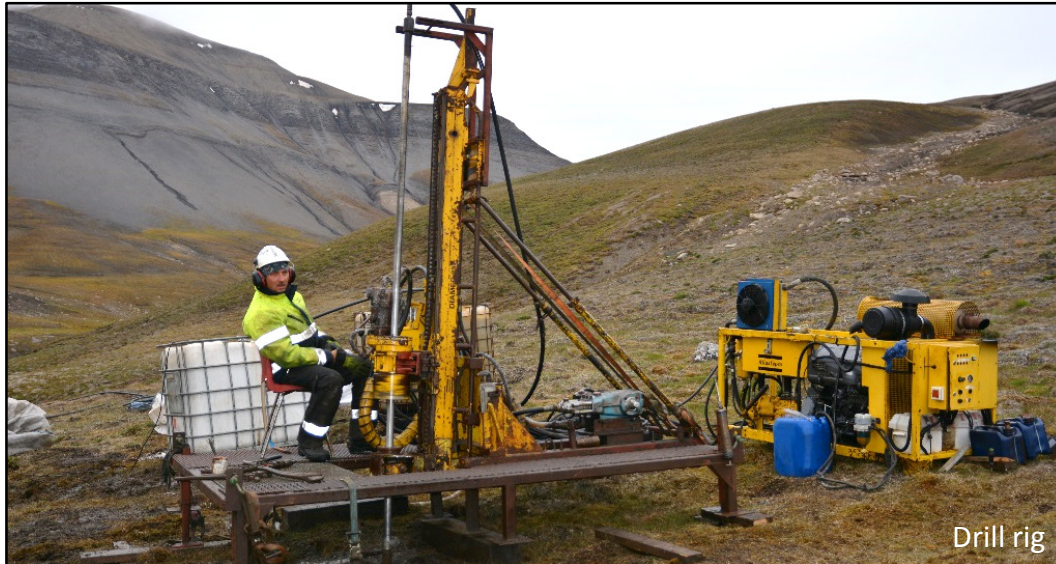


Pillow lava near base



Ropy (pahohoe) top



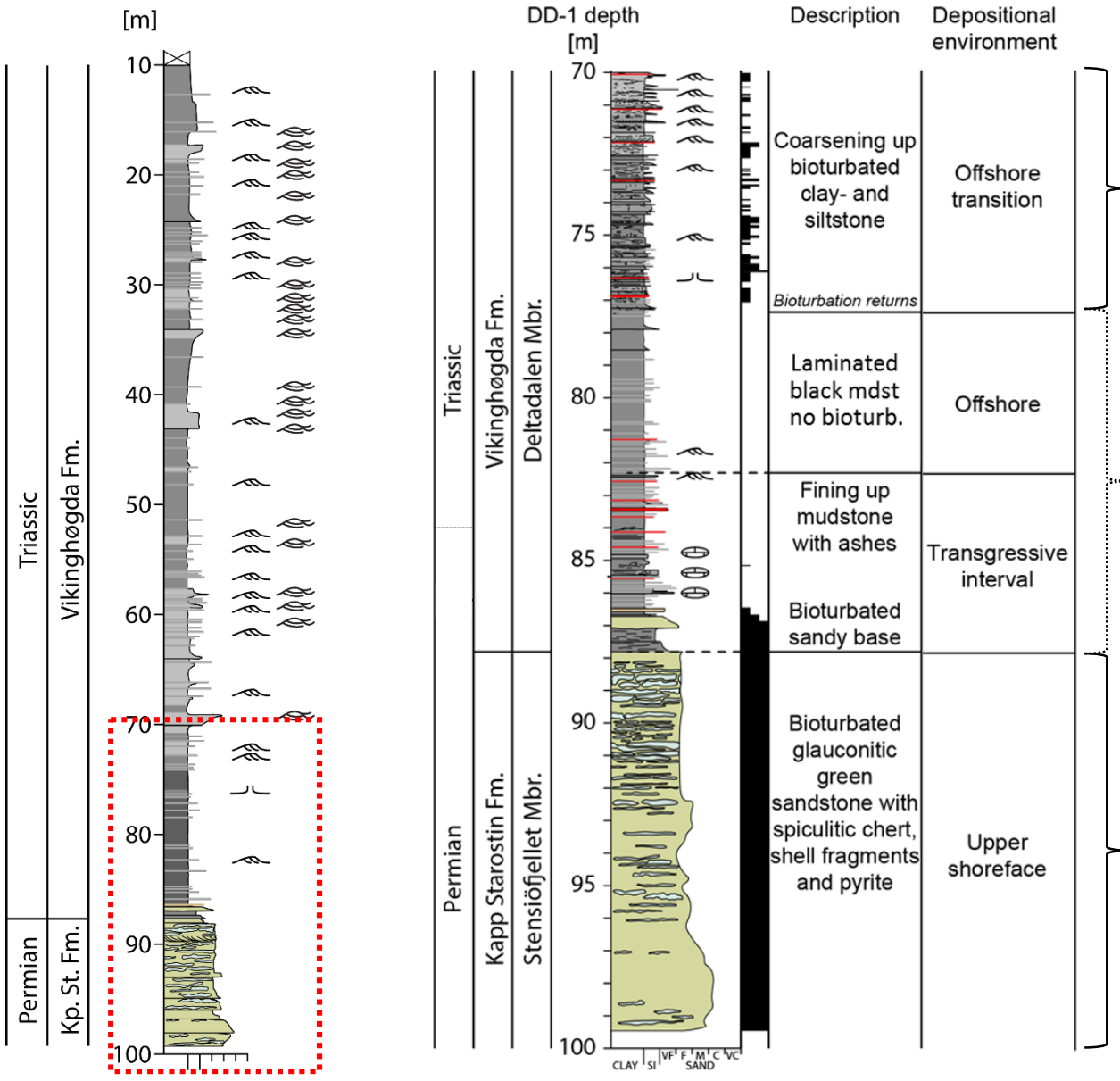


Drilling and extraction by Arctic Drilling (Store Norske)

- Two ca 100 meter deep boreholes (90 meter continuous cores); **DD-1** (Primary) and **DD-2** (Back-up and QC)

Photography and sedimentological field logs by field crew

Permian-Triassic Depositional Development



Life expands

Bioturbation returns

Restricted marine conditions

Ash-layers

Major change in living conditions
"Extinction event"

Glauconitic sand shoals

Upper shoreface? (Blomeier et al., 2013)

Zuchuat et al. (in press)

"A new high-resolution stratigraphic and palaeoenvironmental record spanning the End-Permian Mass Extinction and its aftermath in central Spitsbergen, Svalbard (PALAEO_109732)"

- **Successful drilling** of two cores across the P-T boundary in Svalbard
- **Mass extinction** associated with major changes in depositional system
 - *Organic-rich mud above P-T boundary*
 - *Potential carbonate and clastic Permian reservoirs below*
- Environmental changes likely triggered by the **Siberian Traps Large Igneous Province**

