Geological, geochemical and cosmogenic nuclides constraints from the NEEM core basal sediments, Greenland

M. Protin, P.-H. Blard, J.-L. Tison, F. Fripiat, D. Dahl-Jensen, J. P. Steffensen, V. Debaille, D. Verstraeten, M. Caffee, P. Bierman, L. Corbett, A. J. Christ





Geological and geochemical constraints



% volume

⁽Goossens et al., 2016)

Geological and geochemical constraints



- ★ SR-Nd samples
- ★ C-N samples

Cosmogenic meteoric ¹⁰Be results at NEEM



Comparison with others Greenland measurements



NEEM concentrations in agreement with concentration measured at the margin of the Greenland ice sheet (Graly et al., 2018) and offshore (Christ et al., 2020) but lower than in the basal ice of GISP2 (Bierman et al., 2014)

How to explain the difference in meteoric ¹⁰Be concentrations between GISP2 and NEEM?

The three working hypothesis

How to explain the difference in meteoric ¹⁰Be concentrations between GISP2 and NEEM?

1

IEEN

Shorter exposure time at NEEM than at GISP2

According to the ¹⁰Be_m concentrations, NEEM would have been covered for the order of 150 ka more than GISP2.

(Schaefer et al., 2016)

GISP2

50%

Difficult to justify, not coherent with current ice sheet modeling

Improbable



Higher erosion rate at NEEM than at GISP2



A higher erosion rate would allow to reach deeper horizons of the previous soil containing less ¹⁰Be_m.

Coherent with other Greenland ¹⁰Be_m results, hypothetis retained by these other studies (e.g. *Christ et al., 2020, Graly et al., 2018*)

Probable



Loss by leaching of ¹⁰Be_m

(3)

Potential loss of ¹⁰Be_m due to chemical environment during incorporation into the ice, ice deformation or sample preparation.

Need further investigations