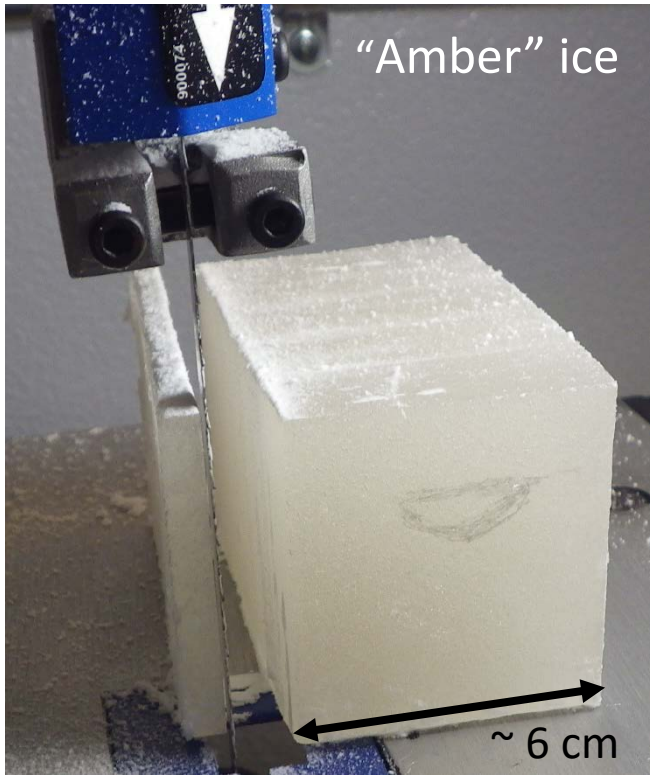
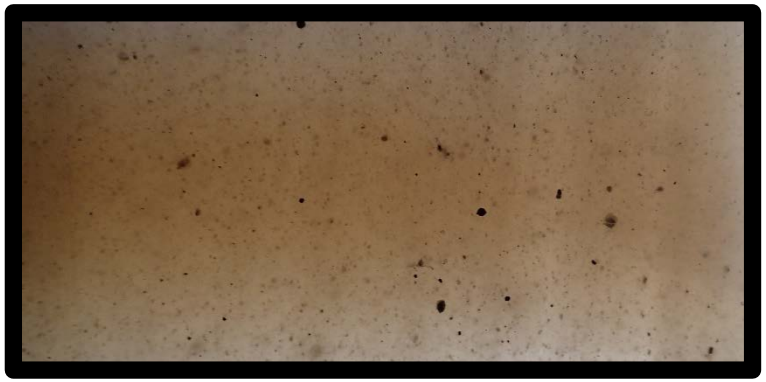
# Debris containing glacial ice: Greenland basal ice

## Grant Land Glacier

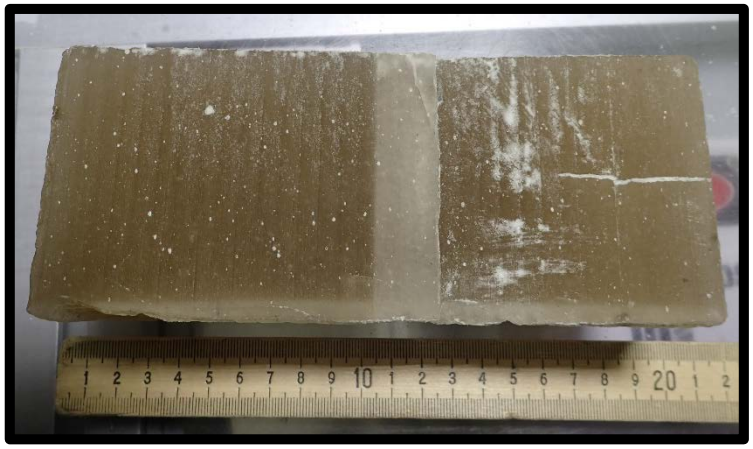


Backlit

~ 10 cm

**GISP 2**
**Ice core**



Photos: M. Skidmore

# Dating of PLD sediment grains?

OSL – Optically Stimulated Luminescence

Used on sediments on Earth for the ages up to ~ 150 Ka, e.g. lake sediments
i.e. which have been shielded from sunlight since deposition

U, Th and K in sediments decay and the ionizing radiation emitted is absorbed by mineral grains in the sediments such as quartz. The radiation causes charge to remain within the grains in structurally unstable "electron traps". Stimulating these mineral grains using either blue or green light causes a luminescence signal to be emitted as the stored unstable electron energy is released.

It has been attempted on sediments from basal ice at ~ 200m depth. Samples were collected at night and then kept dark. Reported age ~ 42 ± 4 Ka (Zhang et al. in review, The Cryosphere Discussions)

**Challenges: 1)** Rate of burial/penetration depth of sunlight in ice – i.e. when mineral grains start to record radioactive decay

**2)** Age uncertainty is ~ 5-10%.