Relocated micas in marble

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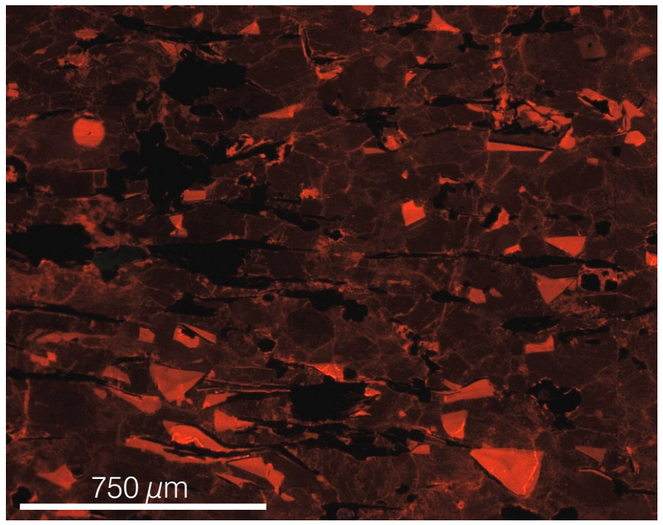

Figure 1: Cathodoluminescence (CL) microscopy image showing an overview of an area where high intensity CL calcite traces the pathways of relocated micas grains.

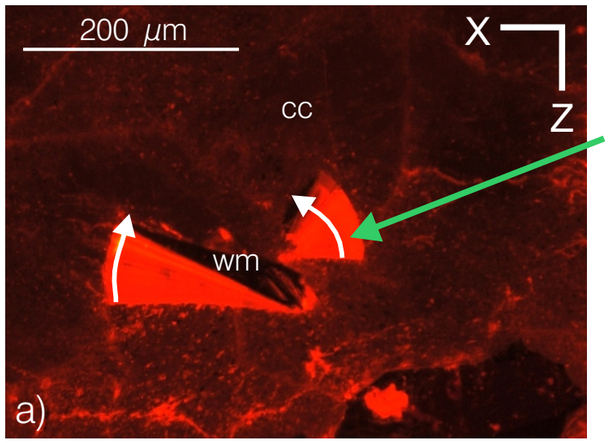

Figure 2a) Exemplary CL closeup of relocated mica grains

precipitated calcite:
- different CL intensity
- lower inclusion density
- less twins
- present in late stage veins

grain boundaries pinned and dragged

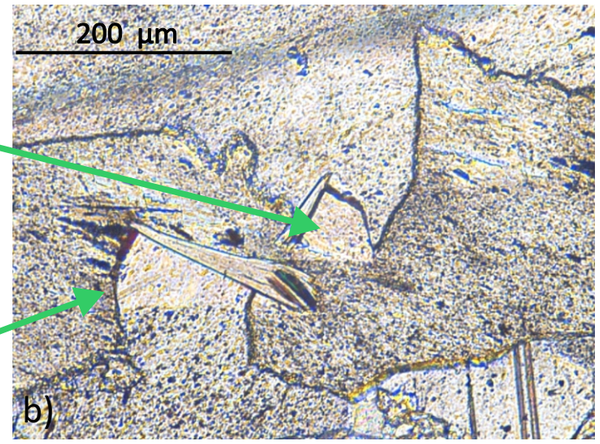

Figure 2b) PPL microscopic image of the same area as in a)

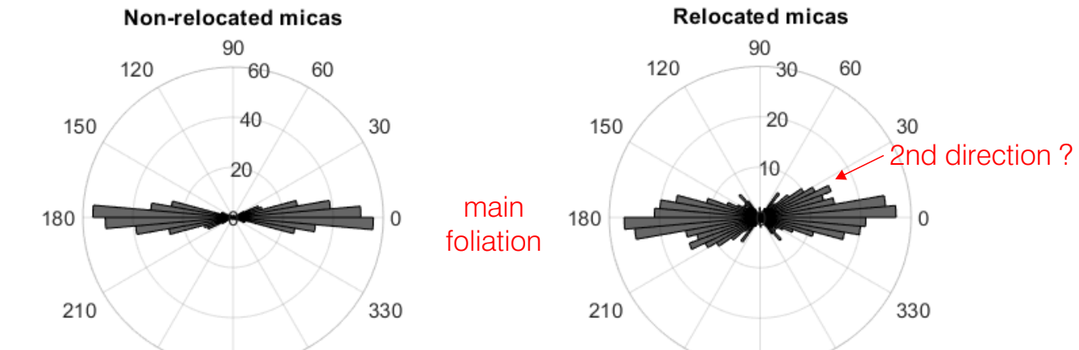

Figure 3: Grain long axes directions of mica grains. Bin width 5°.

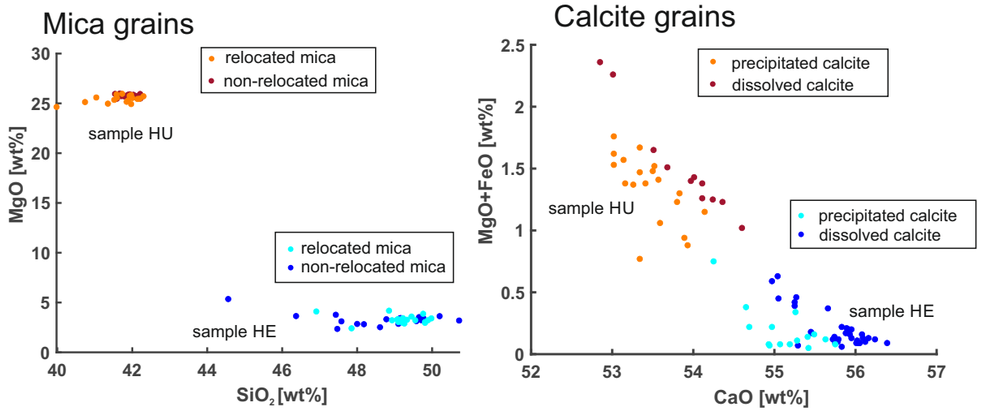

Figure 4: Concentration plots for a) MgO/ SiO2 in mica and b) MgO+FeO/CaO in calcite grains

We observe a relocation of mica grains in marbles by dissolution-precipitation, without deformation of the neighbouring calcite grains (Fig. 1). The process does not affect all mica grains present. Precipitated calcite material (Fig. 2) does not show deformation induced microstructures, hence we assume the process to be late or post-deformational.

The main foliation as defined by mica grains becomes weaker (Fig. 3) and shows a tendency towards a second maximum of preferred direction (~27°).

Relocated and non-relocated mica grains have a similar composition (Fig. 4), showing that the dissolution is not a reaction to chemical difference.

The process has been observed in marble samples with variable overall composition, from different locations in the Erzgebirge (Germany) and also Alpi Apuane, (Italy).

Does this indicate a modification of the microstructure (foliation) without intracrystalline plasticity?

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