

Petrography of impactites from the Dellen impact structure, Sweden

Abstract

shock-metamorphic features created in hypervelocity impacts are important for our understanding of how shock waves interact with geologic materials. minerals like apatite, which contains volatiles that can affect the atmosphere of a body, or magnetite whose magnetic properties constitute a remote sensing indicator. Both Apatite and magnetite have been found to have recrystallized and apatite also has signs of vesicles.

Methods

thin sections were analyzed with a polarizing microscope, BSE and EDS.

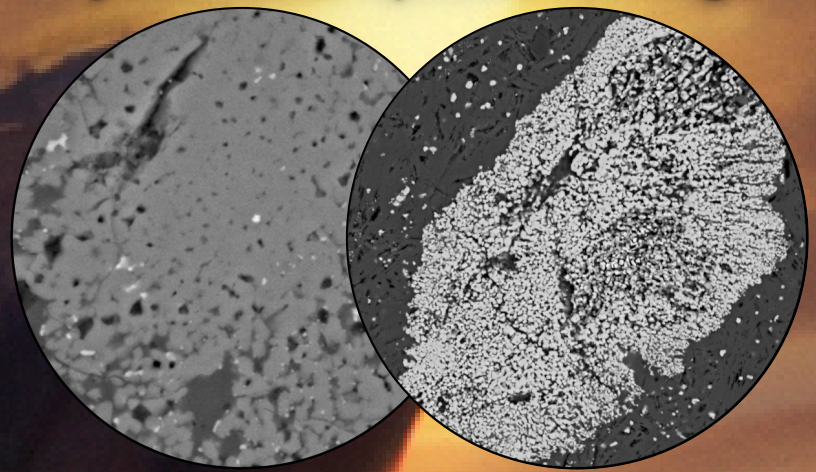
Aim of the study

To further our knowledge of how accessory phases, and particularly apatite and magnetite react to shock waves in hypervelocity impacts.

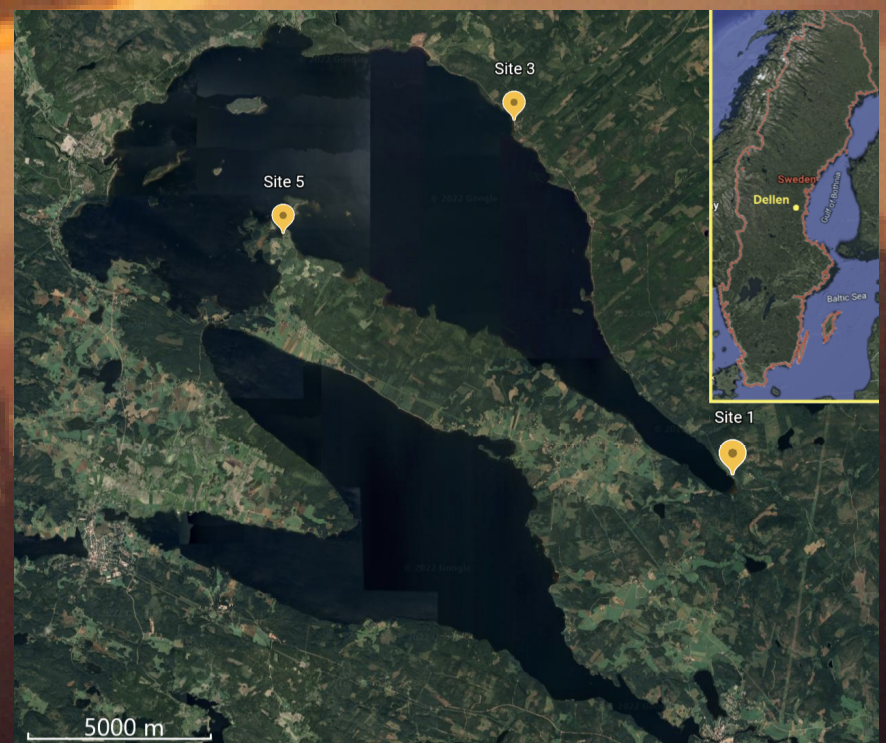
Results

The impactite samples from Dellen contain both low-and high grade shock-metamorphic features including Ballen quartz and lechatelierite. Magnetite has frequently recrystallized into subgrains about 1 μm across in the most shocked sample, which affects magnetism negatively. Magnetite also shows signs of annealing which may reverse the demagnetization trend of the crater structure and give rise to positive anomalies. Apatite also contains tentative vesicles which may have caused the shattering of their host crystal which might indicate that degassing of apatite due to shock wave exposure can occur.

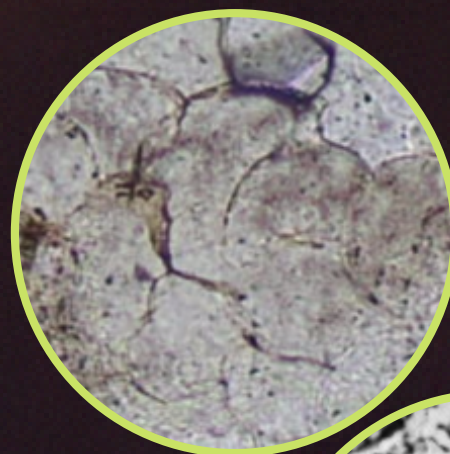
Recrystallized apatite & magnetite



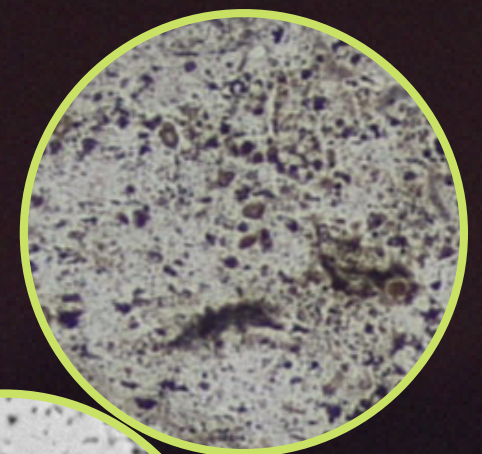
The dellen impact structure & sample sites,



Ballen quartz



Lechatelierite



Annealing magnetite

