CERAMAH TEKNIK TECHNICAL TALK

Hydrothermal fluid and significant in exploration and ore genesis

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Platform: Google meet

Hydrothermal fluid can be found trapped in microscopic cavities within minerals. They are thought to be closed systems and provide important information in characterizing the composition in volatiles, origin, and chemical make-up of fluids. Additionally, density, pressure, and the physical and chemical processes of fluid evolution such as mixing, boiling and conductive cooling can be investigated. Most fluid inclusions range is size between <5µm and 50µm and those that are approximately 10µm in size are excellent candidates for micro thermometric analysis and Laser Raman Spectrometry. Fluid inclusion studies can help discriminate the type of ore system and therefore understand ore genesis. Fluid inclusion data (homogenization temperature and salinity) can serve as vectoring tools in the search for gold and base metal mineralization.

Organized by:
Economic Geology & Mineral Resources Working Group
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Radio-echo Sounding (RES) profiling and numerical modelling

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Platform: Microsoft Teams

Ice sheet stability and contribution to sea level are regulated by high-pressure water that lubricates the ice floor and promotes rapid flow to the sea. In Antarctica, subglacial processes are poorly characterized, limiting our understanding of ice sheet flows and their susceptibility to climate change. Satellite imagery shows streaks of the Foundation ice flow parallel to the ice flow and meandering features of the ice shelf intersecting the ice flow, thought to be formed by water exiting a well-organized subglacial system. Here, ice-penetrating radar data show flow-parallel hard-bed landforms beneath the grounded ice, and channels incised upwards into the ice shelf beneath meandering surface channels. As the ice transitions to flotation, the ice shelf incorporates a corrugation resulting from the landforms. Radar reveals the presence of subglacial water alongside the landforms, indicating a well-organised drainage system in which water exits the ice sheet as a point source, mixes with cavity water and incises upwards into a corrugation peak, accentuating the corrugation downstream. Here, using numerical modelling and geophysical data, we provide evidence of extensive, up to 460 km long, dendritically organized subglacial hydrological systems that stretch from the ice-sheet interior to the grounded margin. We show that these channels transport large fluxes (~24 m^3s^{-1}) of freshwater at high pressure, potentially facilitating enhanced ice flow above. The water exits the ice sheet at specific locations, appearing to drive ice-shelf melting in these areas critical for the ice-sheet stability. Changes in subglacial channel size can affect the water depth and pressure of the surrounding drainage system up to 100 km on either side of the primary channel. Hard-bedded landforms influence both subglacial hydrology and ice-shelf structure and, as they are known to be widespread on formerly glaciated terrain, their influence on the ice-sheet-shelf transition could be more widespread than thought previously. Our results demonstrate the importance of incorporating catchment-scale basal hydrology in calculations of ice-sheet flow and in assessments of ice-shelf melt at grounding zones. Thus, understanding how marginal regions of Antarctica operate and may change in the future requires knowledge of processes acting within and initiating from, the ice-sheet interior.

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