
Interlinked subglacial cavities on Kangerlussuaq, Western Greenland

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Résumé

The glacial hydrology and stability to sliding episodes of the Greenland Ice Sheet (GIS) are closely linked to the subglacial drainage capacity of its bed, which depends on its structure and connectivity. The central-western portion of the GIS, specifically in the region around Kangerlussuaq, is characterized by subglacial drainage systems consisting on meltwater-filled cavities on a hard bed (Harper et al., 2017), which may become interconnected following episodes of increased discharge. Episodes of connectivity following high pressure subglacial meltwater events may lead to enhanced sliding followed by channelization, and emplacement of subglacial floods (Harper et al., 2017)

We present preliminary field and remote sensing observations describing the morphology, topology, organization, and other field characteristics of recently exposed elements of the glacial hydrology system, which were emplaced by the western margin of the GIS. Our field site is located by the Europlanet Transnational Access TA1 Facility 4: Greenland-Kangerlussuaq, which offers a unique opportunity to study the subglacial drainage patterns in this region (Carrivick et al., 2016). Few regions in the world offer the opportunity to study recently emplaced, well exposed subglacial morphologies at the level of accessibility of this site. Field data includes in situ-imagery, observations of glacial sliding directions, description of sedimentary deposits, morphology, scale and characteristics of subglacial cavities, and nature of the connection passages. Data acquired in the field is complimented with remote sensing data from the ArcticDEM and Maxar imagery.

We conclude with a discussion of the implications of our observations for the currently active subglacial hydrology pathways under the western portion of the GIS, including addressing the possible modes of meltwater drainage from the observed morphologies and subglacial geological reconstructions (e.g., White et al., 2016) , as well as a comparison of the morphology and geometry of observed interconnected subglacial cavities to morphologically and topologically similar systems located at the east of Hellas Basin on Mars.

Mots-Clés: Subglacial hydrology, Greenland, geomorphology, quaternary, planetary analogue

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