

Daily cubesat imagery to observe and assess processes in the cryosphere

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The Planet constellation currently consist of 170+ high resolution optical cube-sats. This satellite constellation senses the globe with a daily revisit rate at a resolution of 3.7 meters in four bands. Apart from supporting the International Charter for Space and Major Disasters, their data is available and can be used for research on smaller events in the cryosphere. In this contribution we show some case studies to highlight the specific strong points of this constellation.

The combination of high resolution imagery and daily coverage, makes this constellation ideal for monitoring of glacial lakes and drainage thereof. Supraglacial lake drainage can be monitored through a visual ruler and this is shown for an Alaskan glacier. The Planet constellation continuously points nadir, hence it does not need to be programmed to be pointed towards a site of interest. Consequently, unexpected events are recorded can be analyzed in retrospect. We show a case study of a crack propagation of marine terminating glaciers in British Columbia just prior to a major collapse of the calving front. Furthermore, data from the Planet constellation has a fast downlink and processing chain, thus typically data is available at the same day. This makes it possible to monitor the progress of moving ice afloat on rivers, its evolution over time is shown for a site in Siberia. The last case shows permafrost related rock fall analysis which can be done, examples are shown for the Alps or Scandinavia.

The Planet constellation is another step forward in better recording of the Earth surface and especially useful for risk assessments in remote areas such as the cryosphere. With this contribution and this suit of case-studies we hope to motivate others to consider to use and explore this data. Hopefully leading to a better understanding of these processes and reduce the impact of natural hazards.