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## CLIMATE RESEARCH USING EARTH OBSERVATION CUBESATS: THE PRETTY SATELLITE

**Abstract**

Cubesats and small satellites make it possible to send satellites into low Earth orbit quickly, cheaply, and with few resources. This also makes it possible to develop and launch low-cost missions for Earth observation and climate research. The PRETTY satellite is one such mission.

The PRETTY (Passive REflectomeTry and DosimeTry) 3U CubeSat mission is designed to measure influences on climate and hosts two scientific payloads for passive reflectometry and dosimetry. The first payload is a passive reflectometry system that focuses on grazing elevation angles and uses direct and reflected GPS signals for Earth observation, particularly to observe the elevation variations of ice and sea surfaces. The ground track for the reflectivity measurements is about 15 km x 15 km, improving our understanding of the overall energy transport in the ocean and its role in Earth's climate changes. The second payload will be used to monitor cosmic rays on board the PRETTY spacecraft. The radiation environment is then correlated with the status of the satellite bus electronic systems and payload systems to estimate the effects of cosmic radiation on the customer-off-the-shelf CubeSat components (COTS). The dosimeter system aims to determine the total ionising dose (TID) due to cosmic radiation and is based on radiation-sensitive field-effect transistors (RADFETs) and a floating gate dosimeter (FGDOS) with an accuracy of up to 20mrad.

This paper describes the possibilities and advantages of climate research on small satellites on the basis of the components on board the PRETTY Cubesat. The PRETTY satellite is scheduled for launch on Arianespace's Vega-C VV23 flight in March 2023.