

SIOS airborne platforms and campaigns; a proof of concept to facilitate international collaboration and optimize usage of research infrastructure

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Svalbard Integrated Arctic Earth Observing System (SIOS) is an international partnership of 26 scientific institutions from 9 countries committed to developing an efficient regional observing system in Svalbard. One of the key aims of SIOS is to decrease the environmental footprint of science. In 2019, SIOS member institutions Norwegian research Centre (NORCE) installed optical imaging sensors in the Lufttransport Dornier passenger aircraft stationed in Longyearbyen as part of the SIOS-InfraNor project, making it feasible for research use in Svalbard. To date, SIOS has supported around 20 scientific projects to utilize 50 hours of flight time for applications within terrestrial, marine, cryosphere, biosphere, and hydrosphere environments of Svalbard and associated waters. SIOS Knowledge Centre (SIOS-KC) coordinated all the flight campaigns for the optimized usage of the aircraft and to further reduce the environmental footprint of observations. The proof of concept of using passenger aircraft ensured the following advantages: (1) regular passenger activities and research activities were optimally coordinated to reduce flight hours in carrying scientific observations. (2) proposed projects for the usage of aircraft-based measurements facilitated international collaboration. (3) measurements conducted during 2020 and 2021 are critical to filling the gaps in in-situ observations in Svalbard associated with the travel restriction due to the global pandemic of Covid-2019. (4) data acquired from Dornier aircraft is being used to train the next generation of polar scientists as a part of the annual SIOS remote sensing training course which attracted 295 international participants. (5) airborne measurements are useful for complementing in situ measurements and calibration/validation of running and upcoming satellite missions, e.g., European Space Agency's Sentinel series. In brief, SIOS's airborne research infrastructure is an example of facilitating optimized usage of infrastructure to reduce environmental footprint and facilitate international collaboration.