

## Proxies for mixing layer height, condensation sink and gross primary production



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We will produce proxies relying on satellite measurements by parameterizing with satellite retrievals the variables from intensive campaigns or from long-term measurement data sets. We will use satellite data to derive proxies for mixing layer height measured with Doppler lidar, for condensation sink, and gross primary production of the biosphere. These proxies are crucial for quantifying feedback mechanisms and estimating the sources and concentrations of pollutants in the polar environments.

The first step for the mixing layer height and condensation sink proxies is the derivation of an in-situ based proxy. The proxies are derived based on the in-situ data from SMEAR II (Hari and Kulmala, 2005) and SMEAR I (Hari et al., 1994) stations situated in central and Northern Finland, respectively. The primary variables for the proxies are meteorological variables, including different radiation measures. The derived in-situ proxies will be converted to proxies based on satellite and/or re-analysis, which will be evaluated against the available campaign measurements at the Polar regions, both at the Arctic and the Antarctic.

The proxy for gross primary production is based on the fluorescence, i.e. the IR radiation emitted during plant photosynthesis. We are aiming towards parameterizing photosynthesis with fluorescence observed from

satellites (Porcar-Castell et al., 2014). The proxies are developed initially at the SMEAR II station, where continuous observations of gross primary production are made.

The proxy data sets will be available at the iCUPE web-site with the required meta-data and documentation.

### References

- Hari, P, et al., 1994. *Silva Fennica* **28**, 1, 29–39.
- Hari, P. and Kulmala, M, 2005.: *Boreal Environ. Res.*, **10**, 315–322.
- Porcar-Castell et al., 2014. *Journal of Experimental Botany*, Vol. 65, No. 15, pp. 4065–4095.