

Work Group 6: Variability in surface UV irradiance and ozone column
Ny-Ålesund Atmosphere Flagship open work group meetings, Kjeller, Norway,
7 October 2016

Summary report

During the **first part** of the meeting the participants were informed about the measurement instrumentation and the results achieved by the research teams participating in the Flagship activities and working at NILU (Norway), IG-PAS (Poland) and ISAC-CNR (Italy). In addition, the research group of radiation and remote sensing at the Institute of Meteorology and Climatology of the Hannover University, Germany, presented by Hanno Müller showed interest in the WG6 meeting and in future collaboration. The following presentations were listened and discussed:

- Measurements of solar UV radiation and total ozone, performed by NILU in the frame of the National Monitoring Programme (Tove Svendby, NILU).
- Long-term variability in surface UV radiation over Hornsund for the period 1983-2015 derived from the reconstructed and observed time series (Piotr Sobolewski, Institute of Geophysics, Polish Academy of Science).
- Effective albedo derivation from UV measurements (Hanno Müller, Institute of Meteorology and Climatology, University of Hannover)
- Variability features of the ozone column and surface UV irradiance according to the observations performed by ISAC-CNR at Ny- Ålesund (Boyan Petkov, ISAC-CNR).

Bearing in mind the above presentations it was concluded that the presented technical devices and datasets can be considered a sufficient basis for a joint analysis of the variability in surface solar UV irradiance and ozone column over Svalbard. The available instruments allow us also to plan a future activity on this issue that could enlarge our knowledge about the Arctic atmosphere.

The **second part** of the meeting dealt with some preliminary results about variability of the ozone content over Ny-Ålesund achieved through analysis of ozonesound data. It was decided to work on common publications based on these results together with those obtained by the ground-based instruments, which were discussed in the first part.

The **third part** of the WG6 meeting was devoted to possible future field activities. As a main goal it was planned to organize an intercomparison campaign aimed to assess the quality of the measurement techniques and to uniform the methodologies and data format in order to achieve a

homogeneous data set. In addition, the collaboration with the other WG in the frame of the Atmospheric Flagship activity was discussed. It is expected that such contacts will help us to have correct estimates of the cloud cover, aerosol loadings, albedo and profiles of the atmospheric thermodynamic parameters, and ozone, which are necessary for the model evaluations of the surface UV irradiance.

Some previous publications of the teams participating in WG6:

- Janusz W. Krzyściński and Piotr S. Sobolewski, 2001. The surface UV-B irradiation in the Arctic: Observations at the Polish polar station, Hornsund (77°N, 15°E), 1996-1997. *Journal of Atmospheric and Solar-Terrestrial Physics*, 63, 321–329.
- P.S. Sobolewski, J.W. Krzyściński, 2004-2005. UV measurements at the Polish Polar Station, Hornsund, calibration and data for the period 2005-2006, Publications of the Institute of Geophysics, Polish Academy of Sciences D-67 (382) Atmospheric Ozone. Solar Radiation.
- Sobolewski P., J. W. Krzyściński, J. Jaroslowski, K. Stebel, 2008. Measurements of UV radiation on rotating vertical plane at the ALOMAR Observatory (69° N, 16° E), Norway, 2007. *Atmospheric Chemistry and Physics*, 8, 3033–3043,
- Julian Gröbner, Gregor Hülsen, Sigrid Wuttke, Otto Schrems, Sara De Simone, Veronica Gallo, Claudio Rafanelli, Boyan Petkov, Vito Vitale, Kåre Edvardsen and Kerstin Stebel, 2010. Quality assurance of solar UV irradiance in the Arctic, *Photochemical & Photobiological Sciences*, 9, 384–391.
- Boyan Petkov, Vito Vitale, Julian Gröbner, Gregor Hülsen, Sara De Simone, Veronica Gallo, Claudio Tomasi, Maurizio Busetto, Vigdis Lonar Barth, Christian Lanconelli, Mauro Mazzola, 2012. Short-term variations in surface UV-B irradiance and total ozone column at Ny-Ålesund during the QAARC campaign, *Atmospheric Research*, 108, 9–18.
- Petkov B.H., V. Vitale, C. Tomasi, A. M. Siani, G. Seckmeyer, A. R. Webb, A. R. D. Smedley, G. R. Casale, R. Werner, C. Lanconelli, M. Mazzola, A. Lupi, M. Busetto, H. Diémoz, F. Goutail, U. Köhler, B. D. Mendeva, W. Josefsson, D. Moore, M. L. Bartolomé, J. R. M. González, O. Mišaga, A. Dahlback, Z. Tóth, S. Varghese, H. De Backer, R. Stübi, K. Vaníček, 2014. Response of the ozone column over Europe to the 2011 Arctic ozone depletion event according to ground-based observations and assessment of the consequent variations in surface UV irradiance. *Atmospheric Environment*, 85, 169–178.