Geophysical Research Abstracts
Vol. 14, EGU2012-12974, 2012
EGU General Assembly 2012

iSPEX: the creation of an aerosol sensor network of smartphone spectropolarimeters

F. Snik (1), S. Heikamp (2), J. de Boer (2), C. U. Keller (1), G. van Harten (1), J. M. Smit (3), J. H. H. Rietjens (3), O. Hasekamp (3), D. M. Stam (3), H. Volten (4), and iSPEX team (5)

(1) Universiteit Leiden, Sterrewacht Leiden, the Netherlands (snik@strw.leidenuniv.nl), (2) Universiteit Utrecht, the Netherlands, (3) SRON Netherlands Institute for Space Research, the Netherlands, (4) RIVM National Institute for Health and Environment, the Netherlands, (5) NOVA/SRON/RIVM/KNMI, the Netherlands

An increasing amount people carry a mobile phone with internet connection, camera and large computing power. iSPEX, a spectropolarimetric add-on with complementary app, instantly turns a smartphone into a scientific instrument to measure dust and other aerosols in our atmosphere. A measurement involves scanning the blue sky, which yields the angular behavior of the degree of linear polarization as a function of wavelength, which can unambiguously be interpreted in terms of size, shape and chemical composition of the aerosols in the sky directly above. The measurements are tagged with location and pointing information, and submitted to a central database where they will be interpreted and compiled into an aerosol map. Through crowdsourcing, many people will thus be able to contribute to a better assessment of health risks of particulate matter and of whether or not volcanic ash clouds are dangerous for air traffic. It can also contribute to the understanding of the relationship between atmospheric aerosols and climate change.

To set the scene for iSPEX, we present data from our new ground-based SPEX instrument that will be deployed at the Cabauw meteorological site, which is also host to complementary aerosol measurement equipment (e.g. sunphotometers and LIDARs). We interpret the data using a modified version of the POLDER algorithm. The data from a ground-based SPEX instrument add significantly to the current suite of aerosol measurement equipment, but the data are necessarily very localized. By distributing many iSPEX units, a measurement network can be created that has both large coverage and the potential for detecting localized effects. Obviously, such a smartphone spectropolarimeter is less accurate than its official counterpart at a meteorological site, but we show how many measurements allow for suppression of errors through averaging.

At the poster, we will give a live presentation of the first iSPEX prototype. We hope to convince you that iSPEX is not only a great tool for outreach regarding polarimetry and issues pertaining to atmospheric aerosols, but that it can also contribute to the solution of several urgent social and scientific problems.