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Polly^{NET} - a network of automated Raman-polarization lidars in the framework of ACTRIS/EARLINET

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Polly^{NET} is a network of portable, automated, and continuously measuring Raman-polarization lidars of type Polly operated by several institutes worldwide mostly within the framework of EARLINET/ACTRIS (The European Aerosol Research Lidar Network / The European Aerosol, Clouds, and Trace gases Research Infrastructure). Polly systems are automated Raman-polarization lidars for scientific purpose with the advantages of an easy-to-use and well-characterized instrument. Polly systems all have the same design, same automated operation, and same centralized data processing delivering near-real-time profiling products in analogy to the well-known AERONET sun photometer network. The latest developed Polly is a state-of-the-art multiwavelength lidar with near-range capabilities (3 elastic, 2 Raman, 2 depolarization, 1 water-vapor, 2 near-range elastic, and 2 near-range Raman channels). In addition to the standard EARLINET procedures, emphasis is laid on continuous measurements and near-real-time data provision. Thus, all Polly lidar systems are designed for automatic and unattended operation in 24/7 mode.

By the end of the year 2016, ten Polly systems have been constructed and are deployed worldwide. Polly^{NET} measurements have been performed at 30 locations in Europe, the Amazon rain forest, Southern Chile, South Africa, India, China, Korea, Tajikistan, Israel and over the Atlantic Ocean. Very different aerosol types and aerosol mixtures have been observed. Permanent locations in Europe are in Evora (Portugal), Hohenpeißenberg (Germany), Leipzig/Melpitz (Germany), Warsaw (Poland), Kuopio (Finland) and Crete (Greece).

In the near future, Polly^{NET} is scheduled to be extended by new permanent sites in the so-called dust belt at Cape Verde, Cyprus, Tel Aviv (Israel), and Dushanbe (Tajikistan) and a long term field-campaign in the United Arab Emirates. Most of the permanent locations are equipped with AERONET sun photometer.

The data from the permanent and temporary measurement sites are automatically processed in terms of optical aerosol profiles (backscatter, extinction, and depolarization) and displayed in near-real time at *polly.tropos.de*. In the future, we plan to extent this approach so that quality controlled aerosol products are available for download in near-real time together with newly developed cloud-relevant products (e.g., Ice Nuclei and Cloud Condensation Nuclei concentration estimation). Moreover, the data processing chain will be further developed and merged with ACTRIS. E.g., the combination with Cloudnet (continuous measurements with cloud radar, microwave radiometer, and ceilometer) will be a powerful tool to investigate aerosol-cloud-interaction. A high-resolution target categorization based on absolute calibrated lidar signals has been already developed for such purposes in the frame of HD(CP)^2.