Implementation of New Greenhouse Gas Measurements in Cholpon Ata, Kyrgyz Republic

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The provision of reliable scientific data to characterize the atmosphere's chemical composition is crucial for understanding climate change and for a sound assessment of the environmental players and impacts. Data must be long-term, consistent, of adequate quality, and publicly accessible. Despite the ongoing considerable improvement in spatial data coverage and the large number of GAW stations measuring greenhouse gases around the globe, there are still regions of the world with sparse data coverage.

The project Capacity Building and Twinning for Climate Observing Systems (CATCOS), aimed at establishing and resuming systematic observations of greenhouse gases and other atmospheric and terrestrial Essential Climate Variables in developing and emerging countries where the availability of observations is currently insufficient. It was funded by the Swiss Agency for Development and Cooperation and coordinated by the Federal Office of Meteorology and Climatology MeteoSwiss.

Within CATCOS, Empa established sustainable and high-quality greenhouse gas (carbon dioxide, methane, carbon monoxide and surface ozone) observation in the Kyrgyz Republic. Measurements started in August 2016 at the Cholpon Ata Lake Observatory (42.64 degN, 77.07 degE, 1613 m asl) operated by Kyrgyzhydromet. The observatory is located at the Northern shore of the Issyk Kul lake, a water surface of 180 times 60 km in size. To its north, a mountain range extends up to an altitude of 4300 m. In spring and autumn, clean air is predominantly measured when local activity in the region is low. During summer, touristic activity in the region is prevalent leading to increased traffic. In winter, residential heating in the nearby villages can occasionally lead to elevated greenhouse gas concentrations.

Thus, the station can serve several purposes as it allows observations of background signals representative for a large spatial area, and to assess the impact of local activities on the air quality in the rural Kyrgyz Republic. Repeated training of the Kyrgyzhydromet staff and maintenance visits ensure a sustainable operation which is reflected by a data coverage of more than 94 % during the first 10 months of operation.