

## Pan-Eurasian Experiment (PEEX) Program and GlobalSMEAR initiative

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The Pan-Eurasian Experiment (PEEX) program was initiated as a bottom-up approach by the researchers coming from Finland and Russia in 2012. The main scientific mission of the PEEX program is to understand large-scale feedbacks and interactions between the Earth surface–atmosphere continuum in the changing climate of northern high latitude and in China. The PEEX Science Plan<sup>1</sup> addresses the scientific aims and large-scale research questions of the program. PEEX has also introduced a concept design for a seamless modelling platform and ground-based *in situ* observation systems for detecting land–atmosphere and ocean–atmosphere interactions.

PEEX is currently carrying out its research activities on a project basis and promoting the research infrastructure framework GlobalSMEAR outside Europe, especially in Russia and China. The GlobalSMEAR is an approach towards integrated Global Earth observatory<sup>2</sup> initiated by Academician Markku Kulmala and coordinated by Institute for Atmospheric and Earth System Research of University of Helsinki. The SMEAR (Station Measuring the Earth Surface–Atmosphere Interactions) concept is supporting the implementation of the GlobalSMEAR initiative and offers an observation platform that provides continuous, comprehensive environmental information from local level up to the global Grand Challenges. GlobalSMEAR enables upgrading of the existing stations by adding a site-specific SMEAR-concept instrument setup together with technical guidance together with a detailed data exploitation / science plan. The prototype of the most well-equipped station implementing the SMEAR concept is the SMEAR II (a Station for Measuring Ecosystem–Atmosphere Relations) in Hyytiälä, Finland.

PEEX has also just recently released its Silk Road agenda<sup>3</sup> together with the Digital Belt and Road (DBAR) Initiative. The near-future challenge is to achieve a successful integration of the methodological approaches of the socio–economic research to environmental sciences and to release the 1<sup>st</sup> scientific overview of the PEEX region.

<sup>1</sup>Lappalainen et al. 2016, *Atmos. Chem. Phys.*

<sup>2</sup>Kulmala 2018, *Nature*

<sup>3</sup>Lappalainen et al. 2018, *Big Earth Data*