

Atmospheric dynamics InfraStructure in Europe: The ARISE project

BLANC, Elisabeth¹ ; KERO, Johan^{11*} ; CERANNNA, Lars² ; HAUCHECORNE, Alain³ ; CHARLTON-PEREZ, Andrew⁴ ; KVAERNA, Tormod⁵ ; RIPEPE, Maurizio⁶ ; RAPP, Markus⁷ ; EVERS, Laslo⁸ ; LUEBKEN, Franz-jozef⁹ ; BLINDHEIM, Sandra¹⁰ ; ESPY, Patrick¹² ; LASTOVICKA, Jan¹³ ; BOSSU, Remy¹⁴ ; CAMMAS, Jean-pierre¹⁵ ; KAEMPFER, Niklaus¹⁶ ; PRICE, Colin¹⁷ ; MULLIGAN, Frank¹⁸ ; VOGFJORD, Kristin¹⁹ ; RAMBOLAMANANA, Gerard²⁰ ; IONESCU, Constantin²¹ ; WALLENSTEIN, Nicolau²² ; AGREBI, Abdelouaheb²³ ; DIAWARA, Adama²⁴

¹CEA France, ²BGR Germany, ³CNRS France, ⁴UREAD United Kingdom, ⁵NORSAR Norway, ⁶UNIFI Italy, ⁷DLR/IPA Germany, ⁸KNMI Netherlands, ⁹IAP/Kuhlungsborn Germany, ¹⁰ALOMAR Norway, ¹¹IRF Sweden, ¹²NTNU Norway, ¹³IAP/Prague Czech Republic, ¹⁴CEA subcontracting France, ¹⁵Univ Reunion France, ¹⁶IAP/Bern Switzerland, ¹⁷TAU Israel, ¹⁸NUIM Ireland, ¹⁹IMO Island, ²⁰IOGA Madagascar, ²¹NIEP Romania, ²²FGF Portugal, ²³CNCT Tunisia, ²⁴LAMTO Ivory Coast

There is currently a lack of observations, data and model parameters, which are needed in weather and climate models. ARISE is an EU-funded infrastructure project (FP7 2012-2014 and H2020 2015-2018) with a long-term objective to fill this gap and solve persistent problems facing the applications which depend on atmospheric dynamics. The atmosphere is a dynamic medium being continuously disturbed by winds and atmospheric waves over a broad range of time and spatial scales. Disturbances include large-scale waves such as gravity and planetary waves which transfer energy and momentum from one region of the atmosphere to another. Atmospheric extreme events such as volcanoes, stratospheric warming events, magnetic storms, tornadoes and tropical thunderstorms also constitute significant disturbances to atmospheric dynamics.

The ARISE project aims at establishing a unique atmospheric research and data platform in Europe and outlying regions, including the polar and equatorial regions. It will combine observations with theoretical and modelling studies to elucidate the dynamics of the middle and upper atmosphere. For the first time, several technologies (infrasound, lidar, airglow, radars, ionospheric observations and satellites) will be used simultaneously and in a complementary way. The measurements will be used to improve the parameterization of gravity waves in the stratosphere to better resolve climate models. Such description is crucial to estimate the impact of stratospheric climate forcing on the troposphere. The collected data are required to improve weather forecasting to monthly or seasonal scales, remote volcano monitoring, climate monitoring and other applications. The ARISE data portal aims to provide high-quality, easy-to-use data and advanced data products to a wide scientific community.

Keywords: atmospheric dynamics, infrasound, gravity waves, planetary waves, weather forecasting, climate monitoring