Multi-source, Multi-wavelength FAIR Data and Science-driven E-infrastructure challenges toward OpenScience in Earth, Planetary and Astronomy Sciences: an overview of the CNRS-INSU ongoing initiatives

*Jean-Pierre Vilotte[1]

1. Institut de Physique du Globe de Paris

The Institut des Sciences de l’ Univers (INSU) is a multidisciplinary institute of the French Centre National de la Recherche Scientifique (CNRS) for Astronomy and Astrophysics, Planetary, Ocean and Atmosphere, ans solid Earth sciences.
The impact of Earth, planetary and astronomy sciences and data it produces can be dramatically increased through transnational collaborations and interdisciplinary approach in order to accelerate scientific discoveries and socioeconomic innovation.
Science in this domains is being accelerated by the growing wealth and diversity of multi- source and multi wavelength data produced in edge environments by a wide range of large instruments and observation systems (eg., ground, sea, air, space) and in centralised environments (HPC, Cloud) by large multi-physics and multi-scales simulations and data assimilation.
This creates a collection of problems to support the full cycle of data use from capture, data access, management and curation, data analysis and modelling, through collating and distilling the evidence into forms that will be routinely used in research and decision-making. An important challenge is data logistics and software platform of FAIR services across a continuum of edge and centralised infrastructures that can support all along wide-area workflows with provenance system for open-science.
The emergence of machine learning and deep learning, which are gaining increasing attention, is facing new challenges associated to the wealth of multi-source and multi wavelength data and at the same time raise new challenging issues for open science and FAIR data e- infrastructures.
This will be illustrated through an overview of a number of science-driven and organisational challenges in different disciplines of the CNRS-INSU and how these are addressed at the national and trans-national levels. Synergy with recent initiatives at the national level (e.g., French open science and FAIR data strategic plan, CNRS research data strategic plan) and the European and international (e.g., Belmont Forum, RDA, Go-FAIR, and the European Open Science Cloud) will be discussed.

