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ESA's Science Data Exploitation programme

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This paper will present the main opportunities and plans offered by ESA to the scientific community in the timeframe 2017-2021, where the scientific exploitation of the Sentinels represent a priority.

The Scientific Data Exploitation element represents the main instrument for scientific innovation of ESA exploitation activities, addressing the R&D needs and requirements of the EO and Earth system science communities in terms of novel observations, advanced scientific tools, innovative retrieval methods and products and new Earth system science results.

The programme will be articulated through five main action lines:

Engaging International Science Communities
ESA's structured dialogue with international EO science communities will be strengthened through regular series of dedicated conferences, thematic workshops and user consultations. EO scientists, Earth system scientists, and modellers will be brought to together in a continuous exchange of ideas. As a result various multi-disciplinary expert communities will periodically assess the state-of-art in their fields and prepare research roadmaps jointly with relevant international scientific programmes, recommending priority topics for future ESA projects and work plans.

Developing Open Science Practices and Tools
Open source science practices will be developed to enlarge the user base for European Earth Observation and broaden participation. EO data, information and tools will be made readily accessible to scientists from other fields. Open source scientific toolboxes will be developed to animate science communities, capitalising on various ESA multi-mission toolboxes experiences and assets. Citizen science and crowd-sourcing projects will be launched, as appropriate. On-line courses, science blogs and social media will address the general public. The EO applications platforms will be developed for these purposes.

Advancing EO Methods and Techniques
Targeted research projects will develop cutting-edge methods, novel algorithms, new EO products, and extend the use of Earth Explorers into domains beyond their primary mission objectives. The overall aim is to stimulate widespread scientific use of open data from research and operational missions by pioneering the development of new EO methods to harvest the full scientific potential of these missions. When validated, such new techniques will be made available to other research communities and programmes, and new prototype products will be transferred to operational frameworks and systems.

Advancing Earth System Science
The specific goal is to maximize the scientific impact of ESA and European missions in terms of new discoveries in Earth system science and thereby ensure a major ESA contribution to global Earth Science endeavours. Dedicated projects will research priority questions posed by international Earth System Science communities and will explore new research avenues opened up by the ESA EO science strategy. These activities will strengthen and extend ESA's cooperation with the major international global research programmes.

Translating Exploitation into Novel Mission Concepts
The role of exploitation results as a catalyst for novel mission concepts and future observational principles will be reinforced. Projects will explore, develop, and consolidate the scientific aspects of novel mission concepts, and thereby stimulate ideas for future generation EO missions.