2nd Workshop on International Cooperation in Spaceborne Imaging Spectroscopy

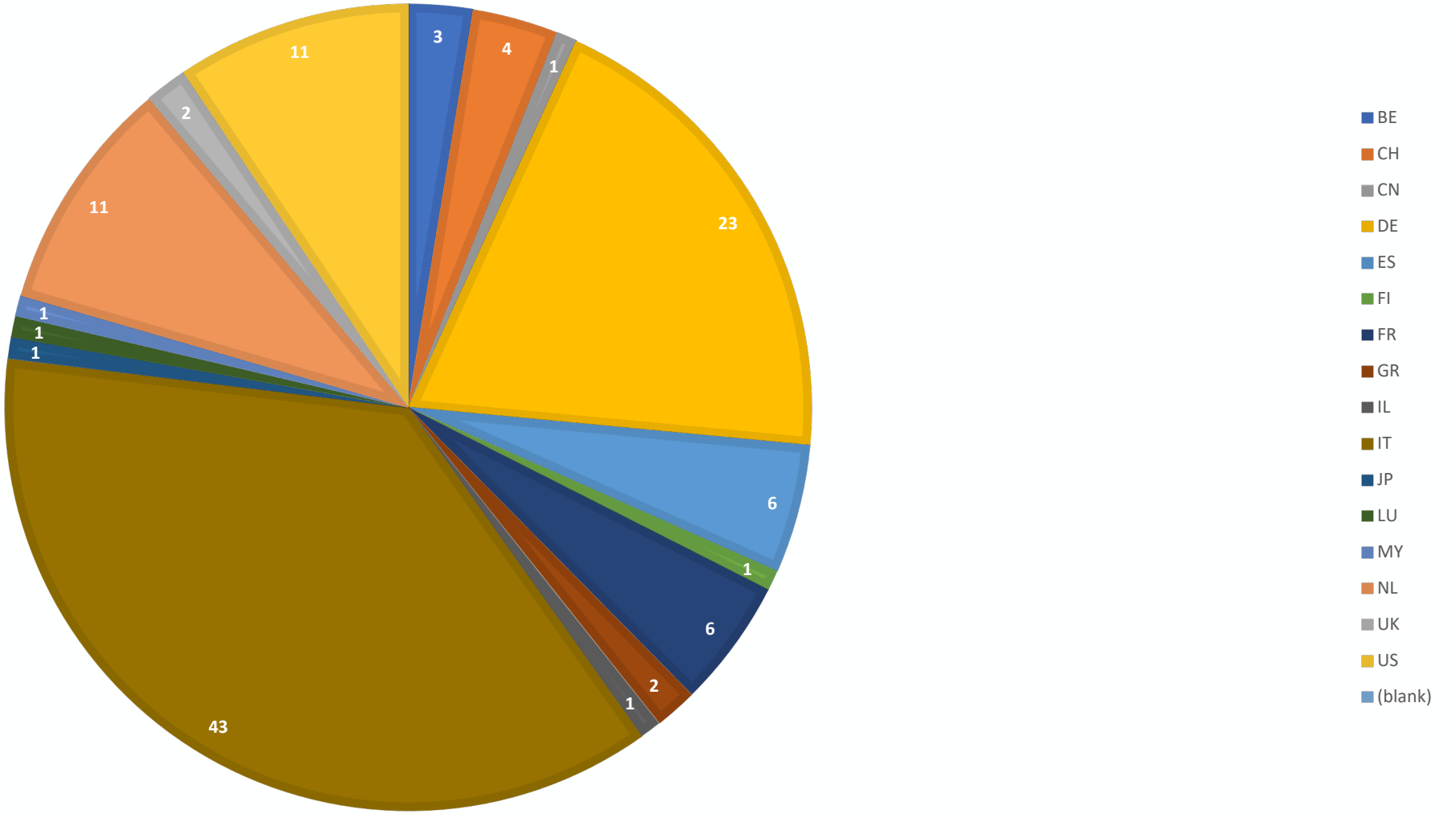
https://hyperspectral2022.esa.int/

19-21 October 2022, Frascati (Italy)

A success for the Imaging Spectroscopy community!

- 81 abstract received from 102 registered participants. In-presence only, with maximum capacity of location of 110 participants.
- Coordinated between ESA, ASI, DLR, NASA with additional contribution from Japan and China
- Main sessions:
  - Hyperspectral Missions overview
  - Harmonisation of data, products and toolboxes
  - Calibration and Validation
  - On-board data processing
  - Geo/biophysical parameters and applications: Vegetation traits retrieval and applications (e.g. agriculture, forestry); Soil properties retrieval and applications; Atmospheric products and applications; Minerals (composition / abundance) and urban applications; Inland and coastal waters products and applications; Cryosphere (snow/ice) products and applications.
- Vibrant discussion and clear commitment of all entities and communities towards a coordinated development

TOTAL NUMBER OF PARTICIPANTS: 102 DISTRIBUTED OVER 16 COUNTRIES



Recommendations (1/3)

- Ensure during the development phase convergence of main mission requirements, products level definition and products specifications. This is already strongly pursued by Agencies for current and future Imaging Spectroscopy missions.
- Ensure robust in-flight calibration procedures, including improved models for natural scenes (e.g. Moon, Deep Convective Clouds, pseudo-invariant calibration sites).
- Ensure a common definition and traceability/propagation of uncertainty at L1, L2 and above. The full traceability chain of uncertainties shall be computed and communicated to the data users.
- Development of L2 algorithms and application methodologies shall consider sensitivity to residual discrepancies between sensors and shall aim at sensor agnostic retrieval algorithms. This shall be fostered by means of intercomparison exercises supported by common reference datasets over a network of sites representative (spatially, spectrally, temporally) of the various domains. This activity shall leverage on existing resources (e.g. campaigns, networks of sites) and invest in complementary efforts (e.g. additional campaigns, new sites, spectral libraries, round-robin comparisons, RTMs).

Recommendations (2/3)

- Foster compliancy with CEOS Analysis Ready Data for the Surface Reflectance and Aquatic Reflectance Product Family Specifications.
- Strengthen the collaborative efforts in harmonization of measurements protocols and in joint acquisitions across Agencies (DESIS, EMIT, HISUI, PRISMA, ENMAP) for collocated measurements, coordinating on technical and programmatic (e.g. prioritisation of acquisitions) aspects.
- Ensure OpenScience approaches are followed both by Agencies and scientific communities
- Enable tools/digital environments to foster collaborative knowledge-sharing environments. This could also facilitate the provision of ensamble products with uncertainties.
- Prepare adequate data management and exploitation solutions fully suitable to handle the immense data volume (also considering the multi-mission approach), leveraging on scalable cutting-edge digital solutions
- Strongly invest in education and capacity building. A stronger participation of early career scientist should be considered for future editions of this Workshop.

Recommendations (3/3)

- Strengthen the involvement of stakeholders and end-users to consolidate needs in preparation of operational products and applications, from local to global products. This process will also facilitate the understanding of the potential for assimilation of IS data in models for Earth Science and Applications development, and best combination of sensors for specific applications.
- Support the development of expertise and capacity to achieve novel methodologies and information products (from local to global) on high-priority applications (e.g., Agriculture, Soil and Minerals, GHG and Air Quality, Ecosystems mapping and Biodiversity, Water Quality and Water Management) with the involvement of key stakeholders and end-users to ensure readiness for rapid uptake.