IAF EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Systems (2)

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STATUS OF COPERNICUS HYPERSPECTRAL IMAGING MISSION FOR THE ENVIRONMENT (CHIME) WITH FOCUS ON END USER PRODUCTS DEVELOPMENT AND INTERNATIONAL COLLABORATION

Abstract

The Copernicus Hyperspectral Imaging Mission for the Environment (CHIME) is one of the high-priority Copernicus Expansion Missions, meant to expand the current capabilities of the Copernicus Space Component in support of European Union (EU) and related policies for the management of natural resources. Thanks to its unique visible to shortwave infrared imaging spectrometer, the CHIME mission is meant to provide routine hyperspectral observations for the management of natural resources, assets and benefits, supporting new and enhanced services for food security, agriculture and raw materials. This includes sustainable agricultural and biodiversity management, soil properties characterization, sustainable mining practices and environment preservation. All CHIME activities (Space Segment, products development, simulators, etc.) have been ramped up in a way to be ready for launch in 2028. The major CHIME development activities described in this paper encompass the dedicated spacecrafts and instruments and, in parallel, both the CHIME Level-1 and Level-2 products prototype processors. Specifically, the following CHIME Core-Products are being developed and will be publicly available: the Level-1B product, i.e., Top-of-Atmosphere (TOA) radiance radiometrically corrected with geometric information

appended but not applied; the Level-1C product, i.e., TOA reflectance in ortho-rectified geometry and geometrically refined using the Copernicus Sentinel-2 Global Reference Image; the Level-2A product, i.e., Bottom-of-Atmosphere (BOA) reflectance in ortho-rectified geometry including the usage of a Digital Elevation Model (DEM) and appended information providing pixel classification. Moreover, the following additional products are being prototyped: the Level-2S product, i.e., BOA reflectance in sensor geometry including the use of a DEM and with geometric information appended but not applied; the Level-2H/-2F products containing harmonized/fused BOA reflectance data acquired by CHIME and NASA's SBG mission; and a number of higher level high-priority Level-2B products such as Canopy Nitrogen Content, Canopy Water Content, Leaf Nitrogen Content, Leaf Water Content, Leaf Mass per Area, Soil Organic Carbon content, and Kaolinite abundance.

This contribution will present the status and the future steps and milestones of the CHIME mission development, providing an overview of the several on-going and planned activities needed in order to make sure that both the CHIME Space and Ground Segments are in place and properly working by the CHIME launch date. Additionally, some insights about the international cooperation framework including NASA's SBG mission, ASI's PRISMA mission, and DLR's EnMAP mission will be provided.