IAF EARTH OBSERVATION SYMPOSIUM (B1)
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ENMAP-PRISMA COORDINATED MULTI-MISSION ACQUISITIONS: OVERVIEW AND FIRST OUTPUTS

Abstract

EnMAP (Environmental Mapping and Analysis Program) is a German hyperspectral satellite mission that monitors and characterizes Earth's environment on a global scale. EnMAP measures geochemical, biochemical and biophysical variables providing information on the status and evolution of terrestrial and aquatic ecosystems. PRISMA (PRecursore IperSpettrale della Missione Applicativa) is an Italian EO hyperspectral Mission funded by ASI as a pre-operational and technology demonstrator, with a focus on the space qualification of a PAN/HYP payload and the development and validation of PAN/HYP products. Launched on 1 April 2022 and 22 March 2019 respectively, these two satellites are currently feeding the hyperspectral community with a large volume of VNIR-SWR images acquired worldwide, stimulating the scientific researches as well as their exploitation for innovative applicative usages. Although it is known that the acquisition of multi-satellite image couples, in geometric (image centers and viewing angles) and acquisition time close similarity conditions (usually called matchups) is useful for cross validation / harmonization and –behind the evaluation of the multi-mission data normalization functions– possible extension of the available pool of hyperspectral products, no or little effort was done for the purposely building of a large set of multi-mission matchups. Until now the acquisition of hyperspectral multi-sensor scenes in similarity conditions has been only coincidental and limited to special campaigns or events, like the AVIRIS campaigns in Europe during summer of 2021 in support of the future Copernicus CHIME mission. Moreover, since EnMAP and PRISMA orbital characteristics are different, building a large set of

matchups cannot be done systematically by simply searching for similar images in both mission catalogues, but requires some degree of coordination between the involved missions acquisition, hence dedicating some resources of both mission to this specific scope, well in line with the DLR-ASI collaboration agreement on hyperspectral data exploitation. Started in July 2024, up to now (end February 2025) we have generated near 30 EnMAP-PRISMA matchups having image centers geometric distance below 5 km, average time distance of 32 min and off-nadir angles maximum deviation of 3 degrees respect nadir condition, with half of these showing a cloudiness below 10Following these promising results, we plan to further continue the coordinated multi-mission acquisitions, deeper analyze (and justify) any possible discrepancies between the characteristics of image couples (radiometry, geometric position) and release the matchups info (geometric position, time and cloudiness level) to the community.