New Possibilities For Air Quality Monitoring From Space-Borne Remote Sensing: Application Of GRASP Algorithm To S5p/TROPOMI and PRISMA Measurements

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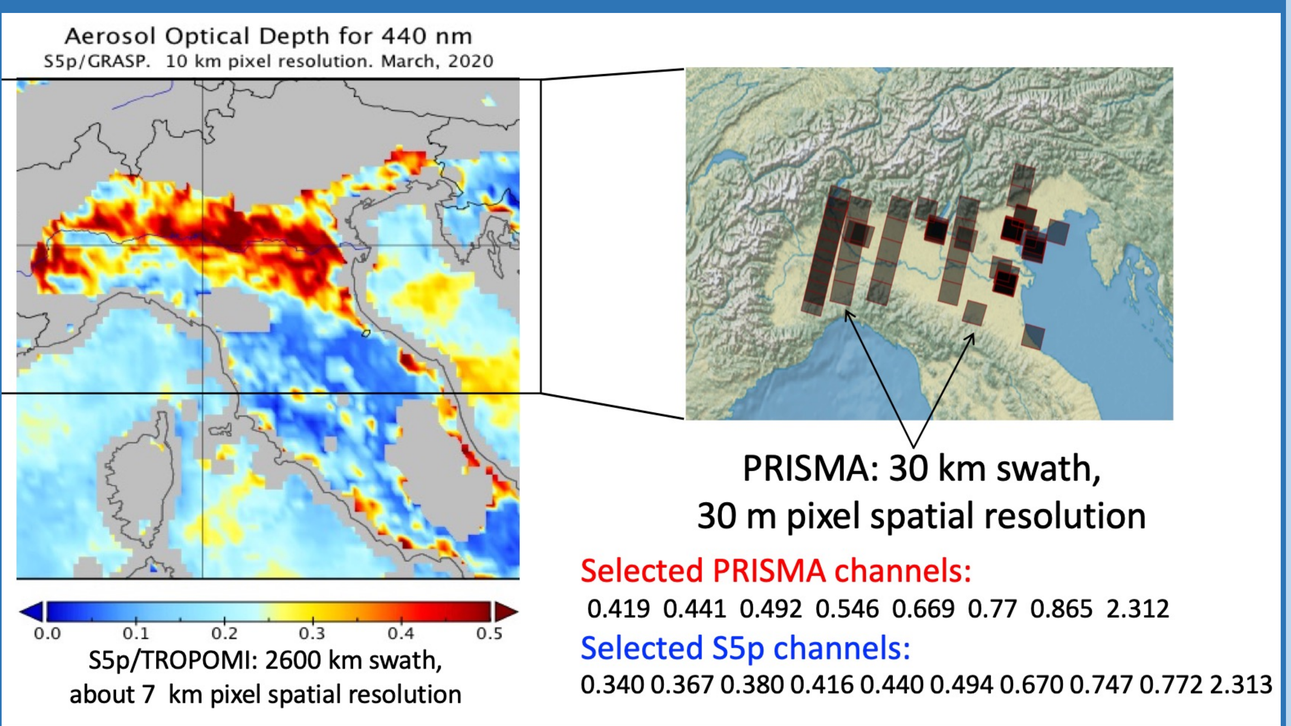
1. S5p/TROPOMI and PRISMA



S5P/TROPOMI provides global hyperspectral measurements in wide spectral range which can be beneficial for aerosol and surface characterization

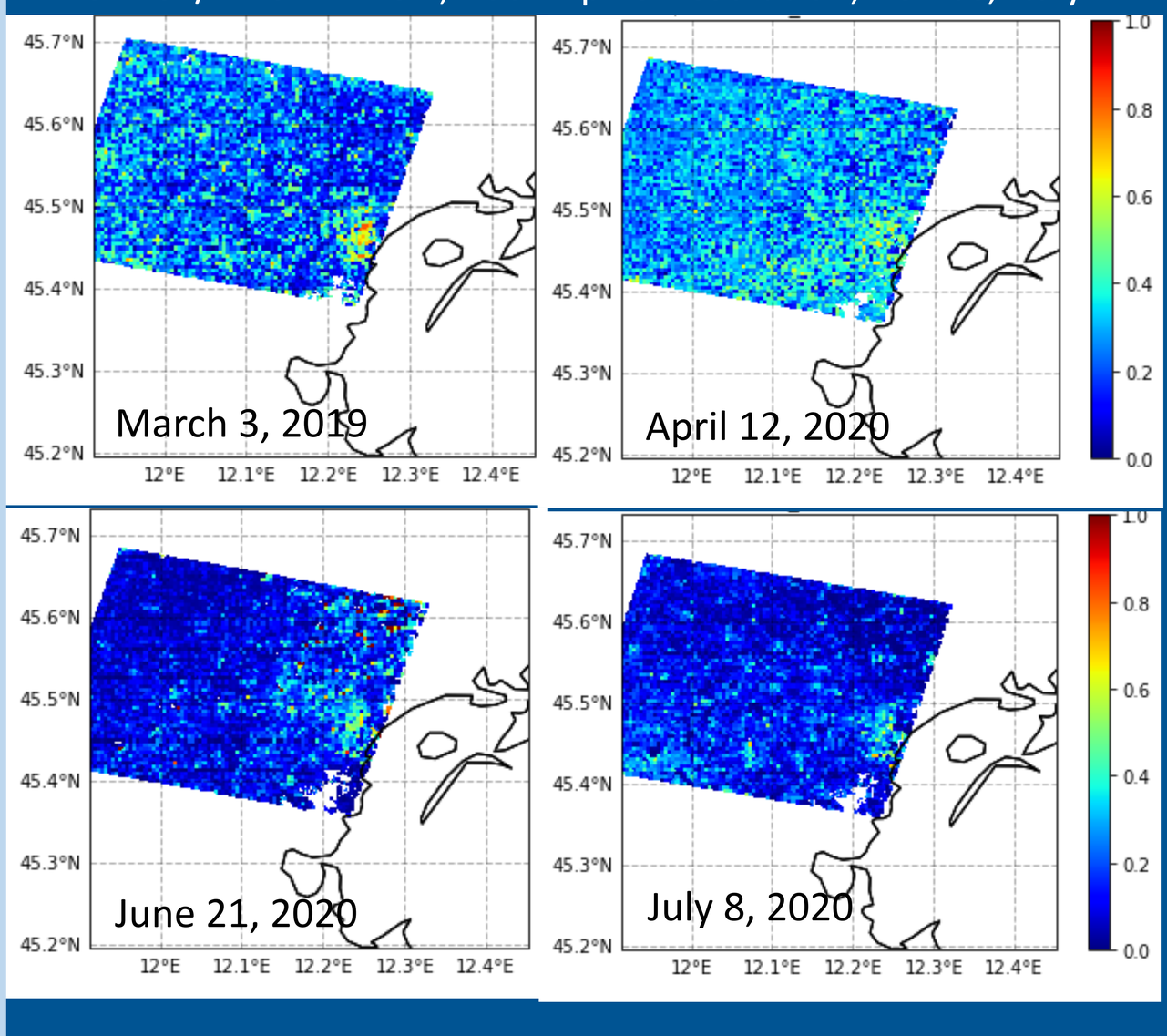
PRISMA (PRecursore IperSpettrale della Missione Applicativa) is an Italian Space Agency (ASI) hyperspectral mission with a swath width of 30 km and with a ground sampling distance of 30 m (hyperspectral), PRISMA measurements can be used for environment monitoring at regional scale but with high spatial resolution.

2. Approach for the combined retrieval

- *GRASP Retrieval of S5p/TROPOMI measurements:*
  - Extended aerosol characterization for aerosol typing (size, absorption)
- *GRASP/PRISMA retrieval :*
  - Aerosol type information from GRASP/TROPOMI retrieval
  - AOD retrieval at high (PRISMA) spatial resolution
  - Surface reflectance at high spatial resolution

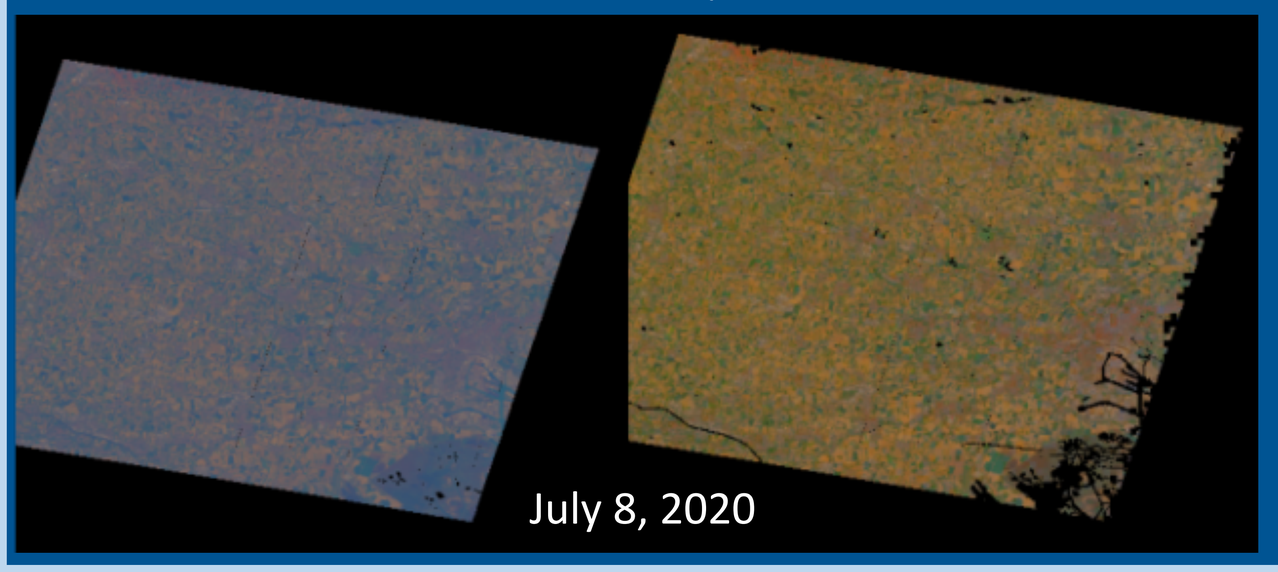
3. AOD and surface reflectance at high resolution from the combined retrieval

GRASP/PRISMA AOD, 100 m pixel resolution, Venice, Italy



Venice, July 8, 2020. 100 m pixel resolution

PRISMA TOA Reflectance GRASP/PRISMA Surface Reflectance



4. Conclusions and outlook

- Combination of the instruments with coarse and fine spatial resolution (for example, S5p/TROPOMI and PRISMA) opens new possibilities for aerosol sources identifications at high spatial resolution and aerosol emission/pollution monitoring.
- The retrieval from the instrument with coarse resolution and global coverage can provide information about aerosol type and aerosol background.
- The retrieval from the sensor with fine spatial resolution can use this information to get AOD at high spatial resolution for identification of local aerosol sources and air quality monitoring.
- The combined retrieval provides enhanced surface reflectance characterization at high spatial resolution.
- Developed GRASP methodology for the combination PRISMA+S5p can potentially incorporate other satellites like S5p+S2 or S5p+OLCI+S2 etc.