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The ENVISAT-ESA Atmospheric-Chemistry dataset: operational data availability and re-processing status

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GOMOS, MIPAS and SCIAMACHY, the three Atmospheric-Chemistry instruments on board the ENVISAT platform are sounding the Earth's atmosphere since about nine years and with the mission extension manoeuvre, successfully carried out in October 2010 it is expected to operate these instruments until the end of 2013. The operational level 1 and level 2 ESA products generated from these three sensors are an essential input to various atmospheric applications, such as weather forecasting, volcanoes ashes detection, air quality monitoring. The re-processing campaigns are important in order to improve the quality of the existing dataset and generate long term series of geophysical parameters that are of vital interest for climate studies and trend analysis, especially in view of the considerable extension of the ENVISAT mission up to a potential total lifetime of more than eleven years. The development and maintenance of the operational ESA processors is possible thanks to an intense cooperation between ESA, industry and science community with the target of maintaining and improving the products quality both in terms of accuracy and number of available geophysical parameters.

The aim of this paper is to provide to the atmospheric science community a comprehensive and accurate overview of the actual status of the official ESA dataset for the ENVISAT Atmospheric-Chemistry missions, for both the operational products (near real time and off-line) and the re-processed datasets. Detailed information will be given about the actual quality of the geophysical output for each instrument, including an assessment on the products accuracy derived from validation measurements. The known quality issues of the current processor baseline will be illustrated together with the corresponding corrective actions, e.g., the planned evolution of the algorithm baseline and the scheduled re-processing campaigns.

Special attention will be given to the MIPAS mission. In fact, during 2010 the MIPAS processor version 5 was activated in operations for the generation of level 1 and level 2 products and the full mission re-processing was completed, aligned to this processor baseline. The restart of the level 2 operational processing was extremely important in order to resume the exploitation of MIPAS data. In addition, the full mission level 2 re-processing allowed to fill a gap in the availability of official ESA products and to meet an overdue requirement of the atmospheric science community. A deep scientific analysis and an extensive validation of this dataset will start during 2011. However, a careful verification of the main products quality indicators and some preliminary validation results have shown that this dataset has the expected data quality, providing confidence about the accuracy of the atmospheric parameters delivered to the users' community. Some minor issues remain on the products content that are currently under investigation and will be corrected during the first quarter of 2011. Nevertheless, the main quality improvements will be part of the next processor baseline, version 6, containing important advances in the level 2 products output, such as the inclusion of four additional retrieved species. The plan and the schedule for the delivery of this new re-processed dataset will be also part of the present paper.