The Operational TROPOMI CH4 Data Product: Advancing Data Quality and Coverage through future updates

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Oral

The Tropospheric Monitoring Instrument (TROPOMI) is the payload instrument aboard ESA's Sentinel 5 Precursor Satellite (S5-P) that was launched in 2017. One of the main objectives of the mission is to deliver the dry air column mixing ratio XCH4 with daily global coverage and high-resolution spatial data, reaching up to 5.5x7km². In this contribution, we give a status update on the operational S5-P CH4 data product and delineate future developments. We introduce an innovative cloud-clearing method, which is independent of SUOMI-NPP VIIRS data. This overcomes the current data dependence between the two missions and so makes it possible to continue the TROPOMI CH4 data processing after the impending decommissioning of SUOMI-NPP. Our approach leverages machine learning techniques and six years of collocated SUOMI-NPP and TROPOMI data and fortifies the reliability of cloud-clearing procedures. Moreover, we establish an AI-based quality flagging of the data product, enabling users to use TROPOMI CH4 data based on the user's accuracy requirement, thereby significantly enhancing data coverage depending on the application. Additionally, we present initial findings on a destriping technique for post-correction of TROPOMI CH4 data. Lastly, we explore the feasibility of delivering a near-real-time TROPOMI CH4 data product, required for CAMS data assimilation and early event detection.

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