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Monitoring Van Allen Radiation Belts using EU Galileo satellites: Observations and Data Products of energetic particle fluxes

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The Environmental Monitoring Units (EMU), on-board two satellites of the EU Galileo constellation, monitor the radiation environment along the GNSS orbit providing measurements of the energetic electron fluxes in the outer Van Allen Belt. With new calibration studies that take into account more realistic shielding provided by the spacecraft and the characteristics of the encountered environment along the satellite orbit, we have derived a new version of the GSAT/EMU Level 1 dataset that provides high quality validated fluxes of trapped energetic electrons within the 0.2-4.5 MeV energy range.

In this work, we present an overview of the EMU measured electron fluxes over the last five years including recently completed validation studies with Arase [ERG] and RBSP energetic electron measurements. The new dataset, available to users from European member states registered at <https://gssc.esa.int>, will be used in the assimilation processes and/or the validation of the ONERA Salammbô electron radiation belt models - under the EU Safespace activity and ESA S2P RBFAN activity - leading to improved forecasts of the state of the outer belt. In addition, the quality of the time-coverage of the dataset permits their use in the development and/or evaluation of quantitative radiation environment specification models.

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