



Acceleration, Transport, Forecasting and Impact of solar energetic particles in the framework of the ‘HESPERIA’ HORIZON 2020 project

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High-energy solar energetic particles (SEPs) emitted from the Sun are a major space weather hazard motivating the development of predictive capabilities. In this work, the current state of knowledge on the origin and forecasting of SEP events will be reviewed. Subsequently, we will present the EU HORIZON2020 HESPERIA (High Energy Solar Particle Events foRecastIng and Analysis) project, its structure, its main scientific objectives and forecasting operational tools, as well as the added value to SEP research both from the observational as well as the SEP modelling perspective. The project addresses through multi-frequency observations and simulations the chain of processes from particle acceleration in the corona, particle transport in the magnetically complex corona and interplanetary space to the detection near 1 AU. Furthermore, publicly available software to invert neutron monitor observations of relativistic SEPs to physical parameters that can be compared with space-borne measurements at lower energies is provided for the first time by HESPERIA. In order to achieve these goals, HESPERIA is exploiting already available large datasets stored in databases such as the neutron monitor database (NMDB) and SEPServer that were developed under EU FP7 projects from 2008 to 2013. Forecasting results of the two novel SEP operational forecasting tools published via the consortium server of ‘HESPERIA’ will be presented, as well as some scientific key results on the acceleration, transport and impact on Earth of high-energy particles.

Acknowledgement: This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 637324.