



‘HESPERIA’ HORIZON 2020 project: High Energy Solar Particle Events foRecastIng and Analysis

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Solar energetic particles (SEPs) are of prime interest for fundamental astrophysics. However, due to their high energies they are a space weather concern for technology in space as well as human space exploration calling for reliable tools with predictive capabilities. The two-year EU HORIZON 2020 project HESPERIA (High Energy Solar Particle Events foRecastIng and Analysis, <http://www.hesperia-space.eu/>) will produce two novel operational SEP forecasting tools based upon proven concepts (UMASEP, REleASE). At the same time the project will advance our understanding of the physical mechanisms that result into high-energy SEP events through the systematic exploitation of the high-energy gamma-ray observations of the FERMI mission and other novel published datasets (PAMELA, AMS), together with in situ SEP measurements near 1 AU. By using multi-frequency observations and performing simulations, the project will address the chain of processes from particle acceleration in the corona, particle transport in the magnetically complex corona and interplanetary space to their detection near 1 AU. Furthermore, HESPERIA will explore the possibility of incorporating the derived results into future innovative space weather services. Publicly available software to invert neutron monitor observations of relativistic SEPs to physical parameters, giving information on the high-energy processes occurring at or near the Sun during solar eruptions, will be provided for the first time. The results of this inversion software will complement the space-borne measurements at adjacent higher energies. In order to achieve these goals HESPERIA will exploit already existing large datasets that are stored into databases built under EU FP7 projects NMDB and SEPServer. The structure of the HESPERIA project, its main objectives and forecasting operational tools, as well as the added value to SEP research will be presented and discussed.

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