

Predicting the Impact of Solar Energetic Particles - the ADVISOR Research Project

Session S1
[S1-10]

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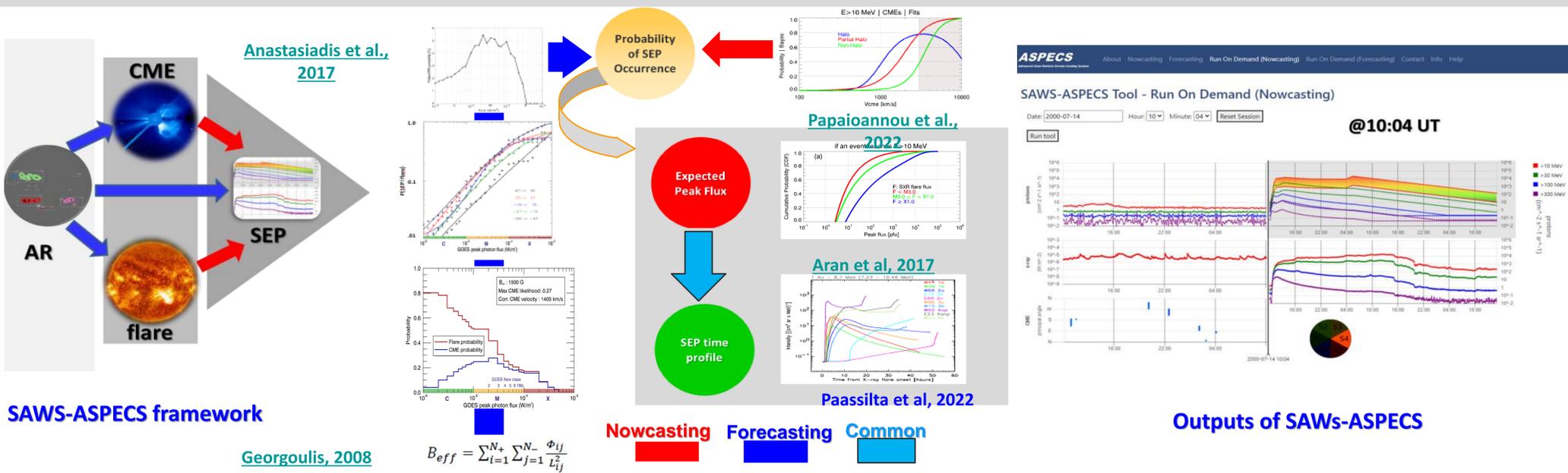
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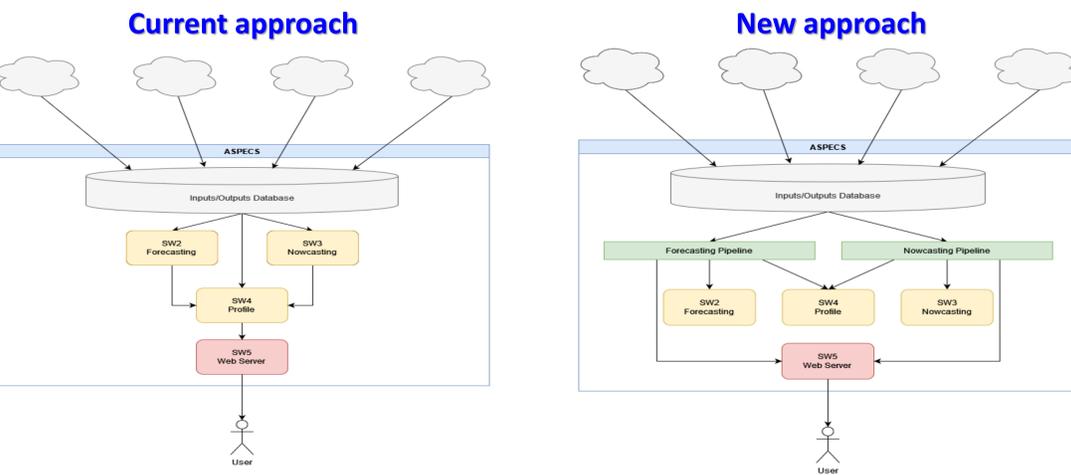
Abstract A system that is in place to predict the impact of Solar Energetic Particles (SEPs) on the radiation environment is of paramount importance for the upcoming critical space exploration missions. In the coming years, astronauts will be sent to the Moon and Mars, expanding the frontiers of current knowledge. Therefore, reliable prediction systems that will deliver timely warnings on the potential of a solar eruptive event to give rise to an upcoming SEP are much needed. Currently, thorough evaluation, understanding, validation, expansion and optimization of such available predicting systems are taking place. The **ADVISOR** (OptimizAtion, DeliVery & Installation of the ASPECS tOol for Space WeaTher research within ISEP) project [<https://members.noa.gr/atpapaio/advisor/>] builds upon the ASPECS (Advanced Solar Particle Event Casting System) tool [<http://phobos-srv.space.noa.gr/>], a 3-tier system combining the forecasting of flares, the statistical forecast of events on the basis of flare and CME characteristics and physics and analytical modeling for predicting particle flux profiles, leading to the complete time profile of SEPs at respective energies of interest. Taking into account the initial efforts that resulted to the integration of the ASPECS's outputs to the NASA Community Coordinated Modeling Center (CCMC) SEP Scoreboard [<https://ccmc.gsfc.nasa.gov/scoreboards/sep/>], with the involvement of NASA SRAG (Space Radiation Analysis Group) and the Moon to Mars (M2M) Space Weather Analysis Office, ADVISOR improves and stabilizes the functionalities and outputs offered by ASPECS. In this work, all technical and scientific refinements and updates are presented.

The SAWS-ASPECS framework

<http://phobos-srv.space.noa.gr/>

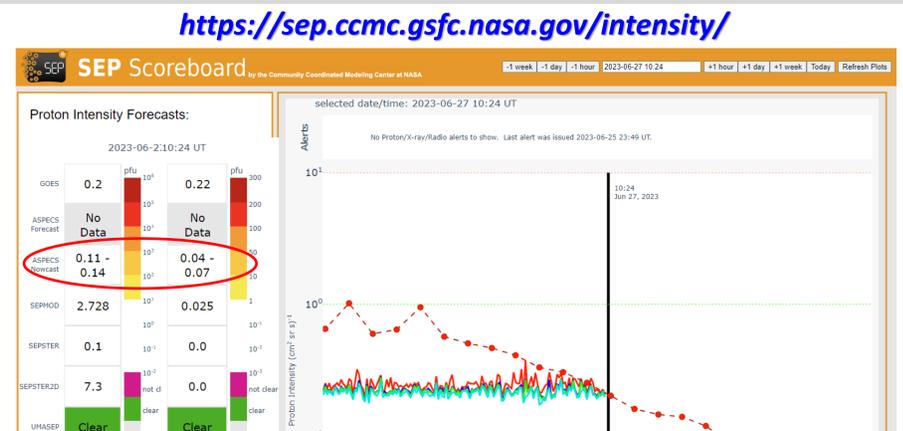
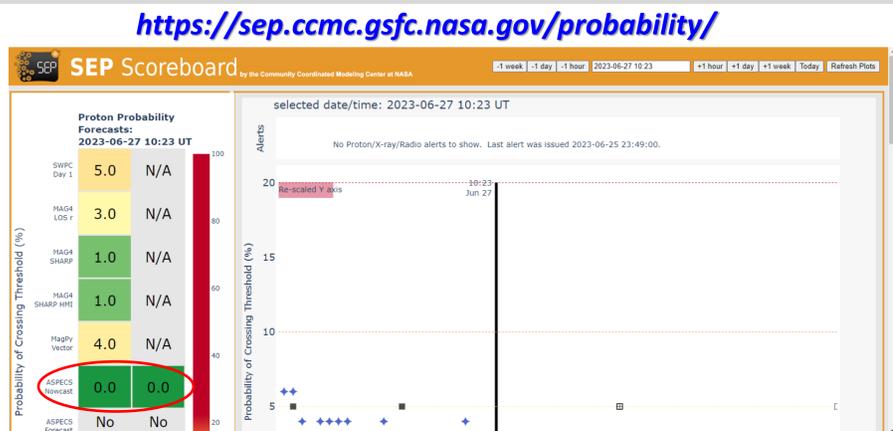


ADVISOR upgrades



ADVISOR incorporates novel software pipelines which are a collection of modules that should be run in sequence or in parallel and they are in supervision. Those are responsible for fetching the input data from the *ASPECS database* and for combining and shaping the output data from the individual modules into the appropriate format. As a result **the modules get simplified** and are responsible only for calculating their respective measures. **This architecture provides ASPECS with the flexibility of easily adding and/or replacing modules in existing pipelines and/or adding new pipelines** for achieving different goals/tasks. **This separates the logic from the tasks and simplifies the overall complexity of the tool. Hence it adds to the operational readiness of the tool**

Integration into NASA/CCMC



References:
Papaioannou et al., *J. Space Weather Space Clim.*, 12, 24, 2022

URL: <https://members.noa.gr/atpapaio/advisor/>

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