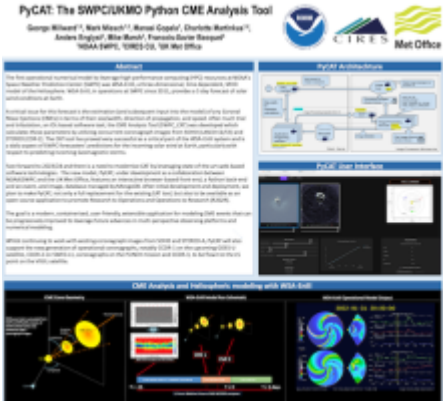
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Poster
The first operational numerical model to leverage high-performance computing (HPC) resources at NOAA's Space Weather Prediction Center (SWPC) was WSA-Enlil, a three-dimensional, time dependent, MHD model of the Heliosphere. WSA-Enlil, in operations at SWPC since 2011, provides a 5 day forecast of solar wind conditions at Earth. A critical issue for this forecast is the estimation (and subsequent input into the model) of any Coronal Mass Ejections (CMEs) in terms of their size/width, direction of propagation, and speed. After much trial and tribulation, an IDL-based software tool, the CME Analysis Tool (SWPC_CAT) was developed which calculates these parameters by utilizing concurrent coronagraph images from SOHO (LASCO C2/C3) and STEREO (COR-2). The CAT tool has proved very successful as a critical part of the WSA-Enlil system and is a daily aspect of SWPC forecasters' predictions for the incoming solar wind at Earth, particularly Geomagnetic storms. Fast-forward to 2023/24 and there is a need to modernize CAT by leveraging state-of-the-art web-based software technologies. The new model, PyCAT, under development as a collaboration between SWPC and the UkMet Office, features an interactive browser-based front-end, a Python back-end and an event database managed by MongoDB. After initial development and deployment, we plan to make PyCAT, not only a full replacement for the existing CAT tool, but also to be available as an open-source application to promote Research to Operations and Operations to Research (R202R). In this vein, we describe the motivation, design, and expected use of pyCAT and encourage the community to participate as users and potentially contributors. The goal is a modern, containerized, user-friendly, extensible application for modeling CME events that can be progressively improved to
leverage future advances in multi-perspective observing platforms and numerical modeling. To that end, whilst continuing to work with existing coronagraph images from SOHO and STEREO-A, PyCAT will also support the new generation of operational coronagraphs, notably CCOR-1 on the upcoming GOES-U satellite, CCOR-2 on SWFO-L1, coronagraphs on the PUNCH mission and CCOR-3 to be flown to the L5 point on the VIGIL satellite.



Poster PDF
Millward-George.pdf
Poster session day
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Poster location
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