

## CCMC/SWRC Space Weather Forecasting Services for NASA Robotic Mission Operators

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Community Coordinated Modeling Center (CCMC) located at NASA GSFC has been one of the core US space weather activities for more than a decade. While the primary CCMC goals are to facilitate community space weather research and usage of state-of-the-art models as well as research to operations (and operations to research) activities, the more recent Space Weather Research Center (SWRC) within CCMC is dedicated to providing space weather services for NASA's robotic mission operators. CCMC/SWRC together with JSC Space Radiation Analysis Group are NASA's space weather services providers for robotic and human exploration, respectively.

In this paper we will review the latest CCMC/SWRC forecasting services that allow addressing NASA's spacecraft operators' needs. The new forecasting tools include space weather databases such as CME, Flare, and SEP Scoreboards, DONKI (Space Weather Database Of Notifications, Knowledge, Information) and novel forecasting capacity such as ensemble CME and flare prediction systems that have been implemented at CCMC. We will also discuss our work on developing future forecasting capabilities that include prototyping novel space weather prediction concepts and higher level of tailoring of services for individual NASA missions.

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