LA-UR-14-23624
Approved for public release; distribution is unlimited.

Title: SHIELDS project: Space Hazards Induced near Earth by Large, Dynamic Storms

Author(s): Jordanova, Vania K.
Godinez Vazquez, Humberto C.

Intended for: Report

Issued: 2014-05-21

Disclaimer:
Los Alamos National Laboratory, an affirmative action/equal opportunity employer,is operated by the Los Alamos National Security, LLC for the National NuclearSecurity Administration of the U.S. Department of Energy under contract DE-AC52-06NA25396. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Departmentof Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

SHIELDS project: Space Hazards Induced near Earth by Large, Dynamic Storms

PI: Vania Jordanova

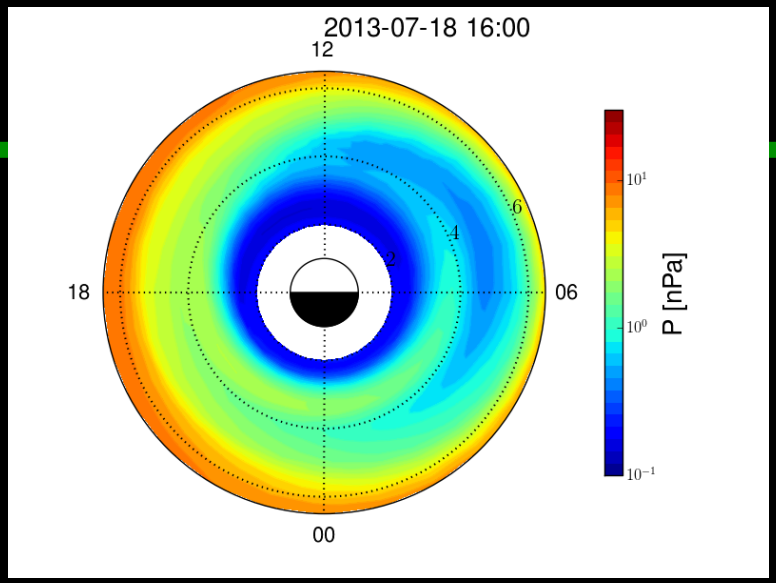
ISR-1

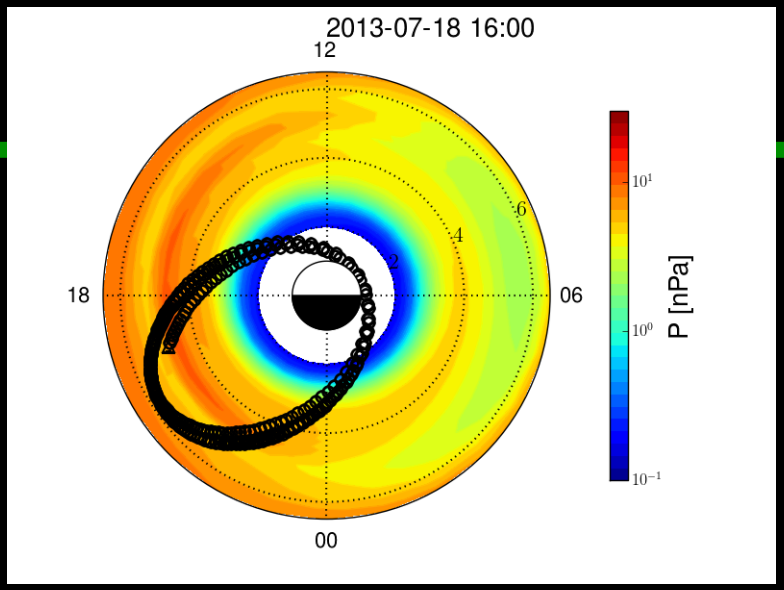
vania@lanl.gov

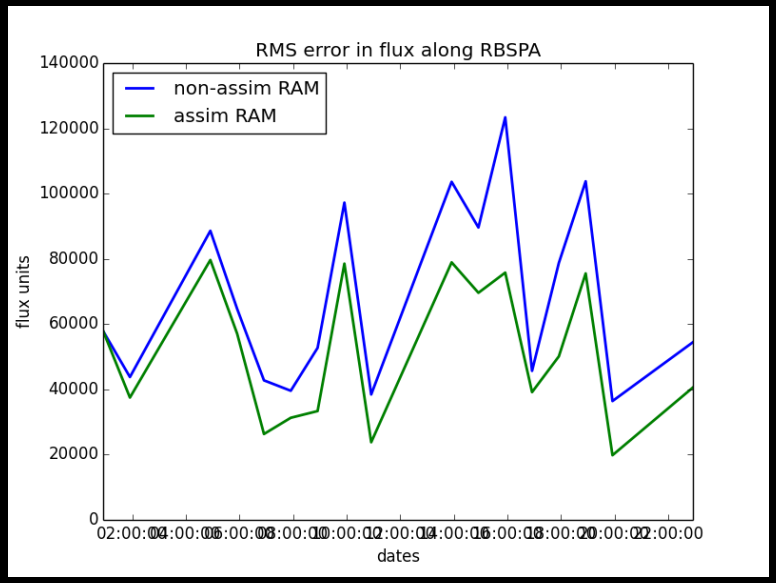
Space Hazards Induced near Earth by Large, Dynamic Storms

- The main objective of SHIELDS project is to develop a new capability to understand, model, and predict the spacecraft Surface Charging Environment (SCE).
- Institutional Computing resources have been used to:
  - Develop and implement a data assimilation method to kinetic ring current–atmosphere interaction model (RAM) and a 3-D equilibrium magnetic field code (SCB)
  - Simulate a high-fidelity simulation of an BATS-R-US magneto hydro-dynamic code
- First results include:
  - Assimilation of RAM-SCB with ensemble Kalman filter using RBSP data

Data Assimilation Results







- Use localized ensemble Kalman filter
- Proton flux data from the RBSP satellite is used for assimilation
- Substorm event observed on July 18,2013; try to reproduce event with data assimilation in RAM-SCB
- Dramatic error reduction in assimilated compared non-assimilated