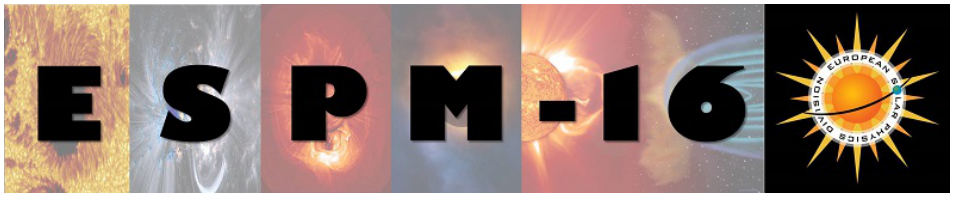

Contribution ID: **194** Type: **Poster**

Validation of the PDFISS method for electric field inversions using magnetic flux emergence simulations

Monday, 6 September 2021 11:37 (13 minutes)

Information on electric fields in the photosphere is required to calculate the electromagnetic energy flux through the photosphere and set up boundary conditions for data-driven magnetohydrodynamic (MHD) simulations of solar eruptions. Recently, the PDFISS method for inversions of electric fields from a sequence of vector magnetograms and Doppler velocity measurements was improved to incorporate spherical geometry and a staggered-grid description of variables. The method was previously validated using synthetic data from anelastic MHD (ANMHD) simulations. We further validate the PDFISS method, using approximately one-hour long MHD simulation data of magnetic flux emergence from the upper convection zone into the solar atmosphere. We reconstruct photospheric electric fields and calculate the Poynting flux, and compare those to the actual values from the simulations. We find that the accuracy of the PDFISS reconstruction is quite good during the emergence phase of the simulated ephemeral active region evolution and decreases during the shearing phase. Analysing our results, we conclude that the more complex nature of the evolution (compared to the previously studied ANMHD case) that includes the shearing evolution phase is responsible for the obtained accuracy decrease.

Student poster?

Primary authors: Dr AFANASYEV, Andrey (LASP, University of Colorado Boulder); Dr KAZACHENKO, Maria (LASP, University of Colorado Boulder); Dr FAN, Yuhong (HAO, National Center for Atmospheric Research); Dr FISHER, George (SSL, University of California Berkeley); Dr TREMBLAY, Benoit (LASP, University of Colorado Boulder)

Presenter: Dr AFANASYEV, Andrey (LASP, University of Colorado Boulder)

Session Classification: Poster Session 1.5

Track Classification: Session 4 - From Radio to Gamma Rays: Near-Sun Manifestations and Triggering of Solar Flares and Coronal Mass Ejections