

Thomas Metcalf Travel Award Summary

2018 SDO Science Workshop: Catalyzing Solar Connections
October 29 – November 2, 2018, Ghent Belgium



Karin Dissauer is a post doc at the University of Graz working with Astrid Veronig and Manuela Temmer on the early propagation and acceleration of solar coronal mass ejections and their associated phenomena, such as coronal dimmings and large-scale waves.

She finished her PhD with honors in October 2018 at the University of Graz where she investigated the statistical relationship between coronal dimmings, solar flares, and coronal mass ejections using optimized multi-point observations of SDO and STEREO.

Oral Contribution: Studying the dynamics of coronal dimmings and their relationship to flares and coronal mass ejections

Coronal dimmings are observed as localized regions of reduced emission in the EUV and soft X-rays, interpreted as density depletions due to mass loss during the CME expansion. They contain crucial information on the evolution and early propagation phase of CMEs low in the corona. For a set of 62 dimming events, characteristic parameters are derived, statistically analyzed and compared with basic flare and CME quantities.

We find that parameters describing the final extent of the dimming, i.e. its total area, the total brightness and the total unsigned magnetic flux, show the highest correlations with the flare fluence ($c > 0.7$) and the CME mass ($c > 0.6$, Fig. 1a). Their time derivatives, describing the dimming dynamics, such as the area growth rate, the brightness change rate and the magnetic flux change rate revealed a strong relationship with the flare strength and the maximal CME speed ($c \sim 0.6$, Fig 1b).

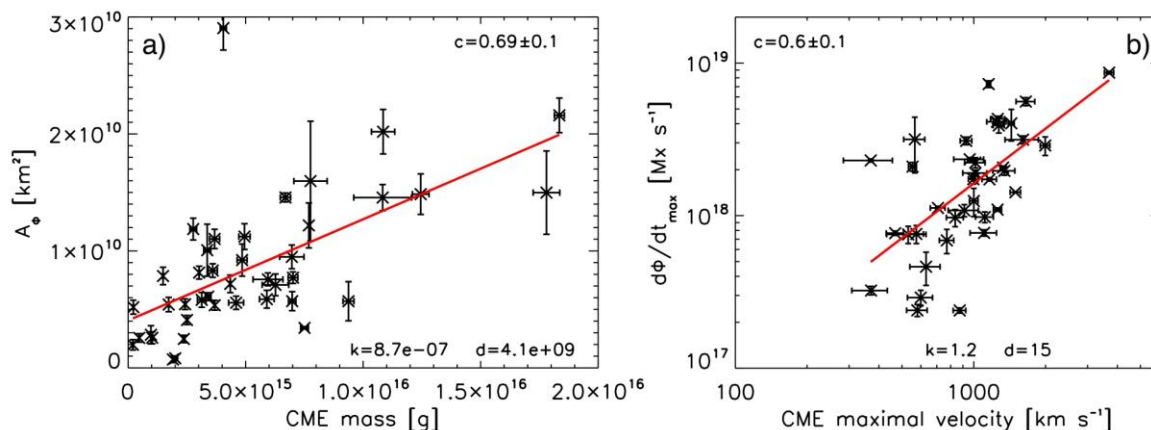


Figure 1: (a): Coronal dimming area against the CME mass in linear space. (b): Total unsigned magnetic flux change rate covered by the dimming region against the maximal speed of the CME in log-log space. The red line indicates the linear regression fit to all data points. The Pearson correlation coefficient is also given in each panel.

"I'm very grateful for the opportunity to attend the SDO 2018 workshop and to present my research. The meeting covered interesting topics related to my research field and I highly appreciated the fruitful discussions with experts in the field. I would like to thank the American Astronomical Society and the Solar Physics Division for selecting me as Thomas Metcalf awardee."