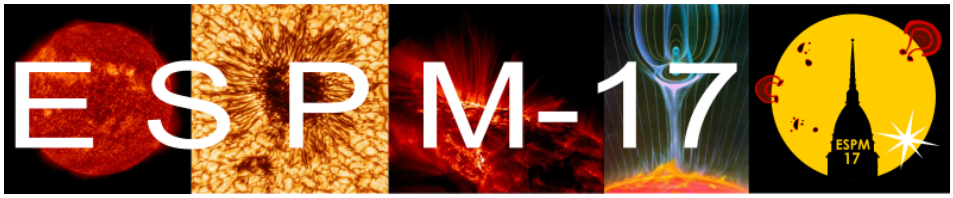

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High-resolution observations of the upflow region dynamics at the border of an active region

The origin of the slow solar wind remains an open issue. One proposed explanation is that upflows at the border of active regions can be a source of the slow solar wind. The processes generating these upflows are not fully understood. Three potential mechanisms have been proposed: (I) reconnection between closed coronal loop and open magnetic field lines in the lower corona, (II) reconnection between chromospheric loops and open fields, and (III) plasma expansion along open magnetic field lines from the chromosphere to the corona.

Our aim is to determine the importance of different mechanisms in driving plasma upflows and their relationship to observed features in imaging data. To do this, we studied the dynamics of an upflow region in AR13262 on the 29th of March, 2023, using data from Solar Orbiter, IRIS, and Hinode. We analyzed spectroscopic data from Hinode/EIS and IRIS to examine plasma from the lower chromosphere to the corona using Doppler velocity maps. We developed a method to identify and determine the location of each upflow mechanism based on spectroscopic data. Using this unique observation set, we analyzed the temporal evolution of plasma flow at different layers of the solar atmosphere. To investigate the connection between the upflow region mechanisms and solar atmospheric features, we used images from EUI/HRIEUV onboard Solar Orbiter, IRIS and SDO/AIA.

Our preliminary findings suggest that mechanism (I) is the main driver of the upflow region, while the relationship between mechanisms and atmospheric features is complex. The investigation are still ongoing.

Primary author: BARCZYNSKI, Krzysztof (PMOD/WRC Davos & ETH Zurich)

Co-authors: ZHUKOV, Andrei (Royal Observatory of Belgium, Solar-Terrestrial Centre of Excellence); VERBEECK, Cis (Royal Observatory of Belgium); BERGHMANS, David (Royal Observatory of Belgium); HARRA, Louise (PMOD/WRC and ETH-Zurich); Dr JANITZEK, Nils (PMOD/WRC Davos & ETH Zurich)

Session Classification: Coffee break and poster session 1

Track Classification: Energy and mass transfer throughout the solar atmosphere and structures within