Eruptions that Drive Coronal Jets in a Solar Active Region
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Abstract
Solar coronal jets are common in both coronal holes and in active regions (e.g., Shibata et al. 1992, Shimojo et al. 1996, Cirtain et al. 2007, Savcheva et al. 2007). Recently, Sterling et al. (2015), using data from Hinode/XRT and SDO/AIA, found that coronal jets originating in polar coronal holes result from the eruption of small-scale filaments (minifilaments). The jet bright point (JBP) seen in X-rays and hotter EUV channels off to one side of the base of the jet’s spire develops at the location where the minifilament erupts, consistent with the JPBs being miniature versions of typical solar flares that occur in the wake of large-scale filament eruptions. Here we consider whether active region coronal jets also result from the same minifilament-eruption mechanism, or whether they instead result from a different mechanism (e.g., Yokoyama & Shibata 1995). We present observations of an off-disk active region (NOAA AR 11513) that produced numerous jets on 2012 June 30, using data from SDO/AIA and HMI, and from GOES/SXI. We find that several of these active region jets also originate with eruptions of minifilaments (size scale ~20”) emanating from small-scale magnetic neutral lines of the filaments. This demonstrates that active region coronal jets are indeed frequently driven by minifilament eruptions. Other jets from the active region were also consistent with their drivers being minifilament eruptions, but we could not confirm this because the onsets of those jets were hidden from our view. This work was supported by funding from NASA/LWS, NASA/HGI, and Hinode. A full report of this study appears in Sterling et al. (2016).

Figure captions and references are provided within the text.