Juno-era updates to the Jupiter flux equivalence mapping model and implications for the predicted polar cap boundary

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The Juno spacecraft has now completed nearly 60 orbits, collecting a wealth of information about Jupiter's polar magnetosphere and aurora. However, there are still many unanswered questions about the size, location, and variability of Jupiter's polar cap or region of field lines that are open to the solar wind. These questions are difficult to answer without a clear link between polar auroral features and source regions in the magnetosphere. Therefore, as a first step, we have updated the flux equivalence mapping model (Vogt et al., 2011, 2015) that allows users to relate a point in Jupiter's middle and outer equatorial magnetosphere to the polar ionosphere. Specifically, we have incorporated new Juno-era Jovian magnetic field models (Connerney et al., 2018, 2020, 2022) and the temporal variability observed in the magnetodisk that is known to influence the mapping of the satellite footprints (Vogt et al., 2017, 2022a, 2022b). The result is an updated flux equivalence mapping model that can be adjusted on an orbit-by-orbit to best interpret the relationship between Juno in situ observations in the polar magnetosphere and the source regions in the equatorial magnetosphere. We will present results from the updated model, including initial predictions for the location of the open/closed field line boundary on each Juno perijove and an initial search for a relationship between Juno's mapped equatorial position and measured ionospheric properties like auroral brightness or plasma composition.