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Height-integrated polar cap conductances during an average substorm

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We track the progression of height-integrated conductances over the course of an average substorm in a narrow local time sector of the nightside polar cap. These conductances are calculated from the mean energy flux and energy flux of precipitation, as estimated from a ratio of auroral emissions of the Lyman-Birge-Hopfield long and short band obtained by multiple polar region crossings of the Defence Meteorological Satellite Program F16, F17, and F18 spacecraft. Contributing auroral emission data span 1 January 2005 to 31 December 2017. Both Pedersen and Hall conductances are considered, as well as the influence of the magnetic latitude of substorm onset. Substorm onset times and magnitudes are provided by the SuperMAG network and SOPHIE substorm lists. We compare superimposed epoch ordered conductances with similarly averaged field aligned currents from the Active Magnetosphere and Planetary Electrodynamics Response Experiment (AMPERE). Shortly before onset, conductances increase in a low latitude region, before an increase in conductance seen at all latitudes at the time of onset. The energy flux is shown to peak quickly after substorm onset, followed by mean energy. The conductances, energy flux, and mean energy are ordered by magnetic latitude of substorm onset, so that the lowest onset latitudes correspond to the highest value of any given parameter. Conductances recover quicker to pre-substorm levels for those substorms with higher onset magnetic latitudes.