The strength of polar cap convection is generally assumed to be determined by the direction and magnitude of the interplanetary magnetic field (IMF) and solar wind dynamic pressure. However, radar measurements of high-latitude ionospheric convection show evidence that ULF power in the IMF has an additional substantial effect on the strength of polar cap convection. It is also generally assumed that the strength of geomagnetic activity along closed plasma sheet field lines is determined by the strength of convection. However, evidence has been found that substorm onsets are preceded by poleward boundary intensification (PBIs) that connect to streamers that reach near the equatorward boundary of the auroral oval, the PBIs and streamers being associated with longitudinally localized flow channels within the plasma sheet that carry new plasma into the inner plasma sheet and lead to onset instability. We will show evidence for the above, as well as evidence that the plasma sheet flow channels associated with PBIs, streamers, and substorm onsets can have their origins in localized convective flow structures within the polar caps. This suggests that localized structure in polar cap convection can be an important driver of plasma sheet dynamics and geomagnetic activity. This would account for the observation that ULF power in the IMF, which enhances the structure of polar convection as well as its strength, also substantially increases the strength of convection within the nightside plasma sheet and is associated with many substorms, including during periods of northward IMF.