

Ring Current Intensity Increases with X-Line Formed Closer to the Earth in the Plasma Sheet

JOSEPH KAN

Geophysical Institute, University of Alaska Fairbanks

A ring current injection conjecture is proposed to synthesize a comprehensive model for stormsubstorm relations. The proposed conjecture consists of: (1) Ring current intensity increases with X-line formed closer to Earth in the plasma sheet. (2) Ring current intensifies by convection with or without substorms. A substorm must include poleward expansion of intense auroral activities in the midnight sector. In descending order of ring current intensity: (A) Sawtooth events during strong southward IMF, ring current intensifies jointly by convection and substorms powered by NEXL at X ~ -10 to -30 Re to produce ring current of major to super storms with Dst ~ -100 to -500 nT. (B) SMC intervals during moderate southward IMF, ring current intensifies by steady convection driven by MTXL at X ~ -30 to -50 Re to produce moderate ring current with Dst ~ -30 to -100 nT. (C) During fluctuating IMF Bz intervals, ring current enhances by weak unsteady convection driven by mid-DTXL at X~ -50 to -80 Re to produce weak ring current with Dst ~ -10 to -30 nT.