Study on the variation of energetic particle pitch angle caused by NWC VLF transmitter

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Based on the observation data collected by the Energetic Particles Detector Package (HEPP) on board CSES satellite during the period of 2018 and 2019. We analyzed the characterizes of pitch angle spectrum of energetic electron precipitated caused by NWC. Our analysis revealed in details the transient properties of the space electrons induced by the man-made VLF wave emitted by the transmitter at NWC. The center location of the NWC electron flux locates in the north hemisphere other than in the south hemisphere during both quiet and disturbance period which is surprising. And the central location of NWC electron belt move westwards during the geomagnetic storm. The pitch angle distributions of the precipitation electron have the maximum flux at about 60-70 degree other than at 90 degree. The pitch angle distributions presented here are examined for evidence of the transportation mechanism especially for the electron loss mechanism.