AN OVERVIEW OF LF PERTURBATIONS AT LOW LATITUDE IN THE SOUTH PACIFIC REGION

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To study short-time scale (~ 1-100 s) early VLF perturbations on Very Low Frequency (VLF) transmitter signals we use SoftPAL and AWESOME VLF data recording systems installed at Suva (18.1o S, 178.5o E, L=1.16) in the year 2006 and 2009, respectively. Typical records showing simultaneous occurrence of VLF events recorded by both the systems show SoftPAL as an equally reliable data recorder. Daytime early/fast events on NWC transmission are associated with only negative amplitude perturbations and have comparatively lower recovery times as compared to most nighttime events. The observations of early/slow events in the daylight propagation will be presented. The unusually long recoveries (≥ 5 min) with strong perturbations (≥ 1 dB) are mainly observed on the transmissions from NPM and NLK in the nighttime only. Such unusually long recovery early/fast events may be associated with large ionic conductivity perturbations associated with gigantic jets or with the combination of sprite and gigantic jets. World-Wide Lightning Location Network detected lightning show that 73% of early VLF events were due to narrow-angle scattering and 27% lightning due to wide-angle scattering under the current literature criteria of size of D-region perturbations of about 100-150 km associated with TLE producing discharges. Recent results on early VLF perturbations indicate that intense lightning (> 200 kA) can disturb VLF transmitter signals as far as 400 km away from the lightning stroke thus producing early VLF event by forward scattering. Strong perturbation events were examined for infrasound and gravity waves signatures associated with strong lightning.