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Spatial and temporal variability of whistler mode emissions in the Earth's inner magnetosphere

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Electromagnetic whistler-mode emissions are important components of the puzzle of the dynamic behavior of the outer Van Allen radiation belt and the slot region. Survey data of the Waves instrument from the Electric and Magnetic Field Instrument Suite and Integrated Science (EMFISIS) onboard the Van Allen Probes are recorded with a nearly 100 % coverage. We use more than 5 years of these measurements to investigate statistical properties of wave power which directly influences results of quasilinear diffusion models.

Previous results have shown that average wave power inside the plasmasphere has a flat peak at a MLT between 8 h and 17 h and L values between 2 and 4 and that it increases with geomagnetic activity. Our results indicate that random variations of wave power are still larger or comparable to the effects of these systematic trends. Power variations from simultaneous spatially separated measurements are dominated by separations in MLT at scales below 30 min, with a weaker influence of separations in L or magnetic latitude. Measurements which were done at close points in space show temporal variations at time scales of tens of minutes.