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Poster
Terrestrial LF (Low Frequency, 30-300 kHz) radio sources group different kind of emissions, including time signals, teleswitches, radiolocation beacons (LORAN system), weather services and broadcasting. The first two purposes occupy radio frequencies closer to the Very Low Frequency (VLF) part of the electromagnetic spectrum, which results in lower efficiencies of the emissions despite relatively large transmitter powers. Other emissions, mainly the broadcasting – located in the opposite part of the LF spectrum, employ efficient antenna systems (quarter-wave linear antenna systems) with even higher radiated powers (reaching few megawatts per station) – this makes them well readable on large areas of continental- and worldwide scale. As for the space environment, since 1960s the electromagnetic emissions' research concentrated on the natural emissions up to 300 kHz (Auroral Kilometric Radiation), which only recently was extended to the detection of human-made emissions coming from the surface of the planet (LORAN's 100 kHz, VLF submarine communication signals etc.). The analysis of these signals gives information about the propagation of LF electromagnetic waves in the Earth's magnetosphere, with possible scenarios of its escape towards the interplanetary medium. Numerous space missions have recorded human-made LF signals in the near-Earth environment (example: INTERBALL/Aurora), showing (many years after the actual data registration took place) that the broadcasting part of the LF spectrum (national radio stations sending acoustic signals, time- and frequency standards and teleswitches) is equally well present in the magnetospheric environment of the planet. Due to higher radiated powers of these signals, aided with high antenna efficiencies, these signals present a high advantage in providing data on the behaviour of the planet's magnetosphere, as well as show a potential way of easy transmission of analogue and digital signals and standards to be received and used onboard orbiting spacecraft. Due to high powers of these emissions, there also exists a high probability of their penetration of the interplanetary environment, if properly calibrated receiving units are allocated onboard interplanetary/interstellar spacecraft. To investigate this phenomena, a series of frequencies is proposed, possible to register with only slightly altered conventional plasma wave detectors (frequency step adjusted / separate indicated frequencies added).
Meeting name
Whole Heliosphere and Planetary Interactions Workshop
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