



Acoustic outdoor measurements with a multi-microphone instrument for planetary atmospheres and surfaces

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In the frame of a novel multi-microphone instrument (Acoustic Sensor Package, ACU) we present acoustic outdoor measurements in order to determine and characterise atmospheric parameters. These sound signatures are complementary to high voltage laboratory investigations carried out for different lightning discharges (EGU2010-10589). The scientific objective for this instrument aboard future planetary in-situ probes, with space heritage from Huygens Atmospheric Structure Instrument / Permittivity, Wave, and Altimetry Experiment (HASI/PWA) on Huygens probe, are manifold: (i) Acoustic source (steady or transient / impulsive / intermittent) location and (ii) characterisation, determination of atmospheric and surface parameters (sound velocity, wind speeds, acoustic waves with direction of arrival, turbulence parameters). Beside the scientific goals, the cultural objective is to get the "sound of a planet". We further describe the systems engineering and hardware development of ACU, with emphasis on multi-micro sensor design, under various constraints (mass, power, telemetry rate) for different atmospheric targets (e.g. Titan, Venus, Mars) and platforms (balloon, entry and landing probes). These outdoor acoustic sound results indicate that fine tuning and adaption of instrumental parameters (digital filters, buffer length, compression algorithms, etc.) are necessary to get reliable results.