Investigation and stochastic simulation of the music of wind and precipitation

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Sound can be used as a means to detect and measure hydrometeorological variables that can generate sound. Thereby rain and wind over the sea surface can be estimated by the sound they produce if the ocean ambient noise is removed. A loud and distinctive sound is produced when the raindrops hit the ocean surface but waves also generate sound when they break. While rain and wind are difficult to measure over the ocean as gauges have to be mounted on surface buoys or ships, acoustic gauges placed beneath the ocean surface have been used as an alternative of measurement. The data that are collected from these gauges are then analysed using empirical models. In order for the sound data to be converted to wind speed and rainfall intensity, climacogram-based stochastic tools are used instead of the more traditional power spectrum ones. Furthermore, an application of this stochastic method is presented on the first ever recorded sound of wind on planet Mars, a mission executed by NASA's InSight lander. The study concludes with a discussion on possible similarities between the sound produced by the above variables and music (e.g. digital music for entertainment).