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Triboelectric events in RNO-G

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The Radio Neutrino Observatory Greenland (RNO-G) has the scientific purpose to observe ultra-high energy cosmogenic neutrinos through in-ice radio detection. The remoteness of polar experiments makes sure that anthropogenic sources of background are naturally lowered. However, other sources of noise are present and have to be studied in order to reach rejection rates necessary to unambiguously identify such rare neutrino events. Triboelectric effects can generate radio signals that represent a possible source of background in such detectors. In polar environments, triboelectic events can be produced by wind blowing over the granular surface of snow, which generates a force that displaces surface charge and induces an electrostatic potential difference, with subsequent coronal discharge. Discharges over timescales of nanoseconds can then lead to radio-frequency emissions at characteristic MHz –GHz frequencies. For RNO-G, as for other radio detectors, this was observed more intensely above a wind speed value of O(10 m/s). Here we present an analysis on the first year RNO-G data that show the possible correlation of high-wind periods and increasing noise.

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