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Microbarometer arrays for the monitoring of extreme weather in a changing climate

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A global network of microbarometer arrays has been installed for the verification of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) using infrasound. The microbarometers also measure pressure variations that are due to various meteorological phenomena, such as gravity waves, with a resolution that exceeds that of typical barometers. Moreover, the use of array technology allows for the estimation of wavefront parameters, which is information that can generally not be obtained from typical automatic weather stations.

The value of these high-resolution observations for the monitoring of extreme weather is discussed here, focusing on two recent extreme weather events in The Netherlands. Data from a dense observational network that includes lidar facilities and the Dutch microbarometer array network is compared to forecasts from global and regional weather forecast models to assess the forecast skill of the state-of-the-art weather models. The first-order agreement suggests that microbarometer arrays could provide valuable data for the development of next-generation weather forecast models. Such developments are useful for Early Warning Centers that report on severe weather outbreaks that can be disruptive for society and which are expected to occur more frequently in a changing climate.

This presentation demonstrates that the infrasound technology, as a civil and scientific application, could aid in the forecasting of extreme weather events that are predicted to occur more frequently in a changing climate.