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Incorporating atmospheric uncertainties into estimates of the detection capability of the IMS infrasound network

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To monitor compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT), a dedicated network is being deployed. Multi-year observations recorded by the International Monitoring System (IMS) infrasound network confirm that its detection capability is highly variable in space and time. Today, numerical modeling techniques provide a basis to better understand the role of different factors describing the source and the atmosphere that influence propagation predictions. Previous studies estimated the radiated source energy from remote observations using frequency dependent attenuation relation and state-of-the-art specifications of the stratospheric wind. In order to account for a realistic description of the dynamic structure of the atmosphere, model predictions are further enhanced by wind and temperature error distributions as measured in the framework of the ARISE project (http://arise-project.eu/). In the context of the future verification of the CTBT, these predictions quantify uncertainties in the spatial and temporal variability of the IMS infrasound network performance in higher resolution, and will be helpful for the design and prioritizing maintenance of any arbitrary infrasound monitoring network.