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25 years of infrasound monitoring: achievements and new challenges

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The infrasound International Monitoring System (IMS) is a unique tool for atmospheric observations due to its high capacity for long-range detection and localisation. Its development motivated technological innovation in sensors, array stations and automatic detection algorithms. The rapidly increasing number of certified stations provided a large diversity of man-made and natural events, well identified thanks to their precise description. Numerical simulations, based on revisited propagation laws, quantified its high performances and variability. Data analyses then clearly demonstrated that the simulation uncertainties originate from the middle atmosphere variability, which controls the infrasound waveguides and is under-represented in models. Unexpectedly, relevant atmospheric parameters were identified in signals from well-known sources such as volcanoes, opening new remote sensing possibilities. The IMS is associated to complementary networks in the Atmospheric dynamics Research InfraStructure in Europe (ARISE) framework, providing an improved description of the middle atmosphere disturbances relevant both for infrasound monitoring and applications such as medium-range weather predictions. Today, archived data reveals climate change effects on specific events such as icebreaking or lightning activity and a remote volcano monitoring system is developed to provide alert to civil aviation, showing the high IMS potential for weather, climate and civil security applications.

Promotional text

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