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Validating upper-wind models using infrasound from active volcanoes

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Known and quasi permanent infrasonic sources are needed to evaluate and improve upper-wind models. Infrasonds generated by active volcanoes offer a unique opportunity for atmospheric studies. The Yasur volcano in the Vanuatu archipelago is an outstanding source of infrasonic waves due to its regular activity. This volcano is permanently monitored by the IS22 infrasound station located in New Caledonia and by one microbarometer installed close to its crater. A 5-year monitoring period of Yasur at short and large propagation range provides new insights on quantitative relationships between infrasonic observables and atmospheric specifications. This experimental setting is proposed to validate consistently the Naval Research Laboratory Ground to Space (NRL-G2S) semi-empirical atmospheric model up to the stratosphere. The propagation modelling results accurately explain seasonal changes as well as small short-timescale variations of the infrasonic observables. This study demonstrates that the use of appropriate propagation tools along with the NRL-G2S specifications provides accurate enough results for most of the long-range observations for the purpose of operational infrasound monitoring.