Growin: Modeling Ionospheric Instability Growth Rates and Giving Away the Code

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The first seasonal and zonal climatology of Rayleigh-Taylor growth rates during solar minimum and solar moderate conditions as a function of local time and altitude has been developed using open source data and software.
The *growin* python module utilizes other Heliophysics python modules to collate and process vertical plasma drift to drive the SAMI2 model and subsequently calculate the flux tube integrated Rayleigh-Taylor growth rate.
The process is repeated for two different types of drift inputs: the Fejer-Scherliess model and measured drifts from C/NOFS.
These growth rates are compared to bubble occurrence frequencies obtained from a dataset of bubbles detected by the C/NOFS satellite.
There is agreement between periods of strong positive instability growth and high frequencies of bubble occurrence in both low and moderate solar activity conditions when using C/NOFS drifts.
Fejer drifts are only in agreement with bubble occurrence frequencies during moderate solar activity conditions.
Bubble occurrence frequencies are often above 25% even when growth rates in the bottomside F region are negative.
The climatological nature of the growth rates discussed here begs further study into the diurnal variability of the growth rate and its drivers.

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