

# Sub-Neptune atmospheres at high resolution with ANDES: can we observe robust signals?

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## Abstract

The most probable outcome of planetary formation is a sub-Neptune, a body with a radius between 2.0 and 3.5 Earth radii. This type of exoplanet has no counterpart in the Solar System, but they are very common elsewhere, and many of them have been observed to potentially host habitable surface conditions. Population studies have revealed a scarcity of exoplanets around 1.5 and 2.0 Earth radii, the so-called "radius valley", which leads to multiple questions about formation and evolution theories. Exo-atmospheric properties like the mean molecular weight and metallicity can be linked to the exoplanet's interior composition. Thus, atmospheric characterization can help us to address those links, opening a window to investigate their formation and evolution.

In this context, our objective is to evaluate the potential of both existing and near future instrumentation to explore the formation and evolution of potentially habitable worlds through atmospheric characterization. To achieve this, we present realistic high spectral resolution simulations of specific targets as observed with CRIRES+ and ANDES, aiming to identify significant molecular signatures in their atmospheres, such as H<sub>2</sub>O, CO<sub>2</sub>, and CH<sub>4</sub>.

My poster in zenodo.org can be found here