

S12 INVITED TALK: WATER CONTENT TRENDS IN LOW-MASS MULTIPLANETARY SYSTEMS

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Abstract. Both rocky super-Earths and volatile-rich sub-Neptunes have been found simultaneously in multi-planetary systems, suggesting that these systems are appropriate to study different composition and formation pathways within the same environment. To estimate their composition, we present an interior structure model that includes self-consistently an atmosphere in radiative-convective equilibrium. We use our interior-atmosphere model within a Bayesian adaptive Markov Chain Monte Carlo (MCMC) for the detailed analysis of individual planets, allowing to estimate the uncertainties of the compositional parameters, core mass fraction and water mass fraction, given the error bars of the observed mass and radius.

In this talk, I will present the development of this compositional model for super-Earths and sub-Neptunes, as well as its application to different planetary systems. I will focus in particular on the homogeneous analysis of a sample of multi-planetary systems hosting 5 or more exoplanets. Their composition gives us clues about their possible formation site in the protoplanetary disk and their formation mechanisms, including atmospheric escape. I will also discuss the uncertainties and degeneracies interior models face when estimating the volatile content of low-mass planets, and how JWST and future telescopes can help narrow down their possible compositions.

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