# Modeling volatile species in magma ocean-atmosphere interactions on hot rockyexoplanets

Buchem, C.P.A. van; Miguel, Y.; Westrenen, W. van

EPSC Abstracts
Vol. 15, EPSC2021-687, 2021
https://doi.org/10.5194/epsc2021-687
Europlanet Science Congress 2021


# Modeling volatile species in magma ocean-atmosphere interactions on hot rockyexoplanets

**Christiaan Van Buchem**[1], Yamila Miguel[1], and Wim Van Westrenen[2]
[1]Leiden Observatory, Leiden University, Leiden, The Netherlands
[2]Faculty of Science, Earth Sciences, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

Hot rocky exoplanets present us with the unique opportunity to give us insights into their interiors through the characterization of their atmospheres. With the upcoming launch of the JWST and ARIEL ushering in a new era of exoplanet observations, this topic is becoming more relevant than ever.

A crucial element in this work is the accurate modeling of the interaction between planetary atmospheres and their magma oceans. The key question here being: What is the atmospheric composition of a hot rocky exoplanet for a given magma ocean composition? One pressing issue one must face when answering this question is the inclusion of volatile species (such as H2, H2O, CO2, etc.). Currently, hot rocky exoplanets are often assumed to be entirely depleted of volatile species, or simplified models are applied in which but a few species in both the melt and the atmosphere are taken into account.

In this presentation we will show our ongoing work on including volatiles species in the modeling of magma ocean-atmosphere interactions on hot rocky exoplanets. The successful development of this method and subsequent comparisons to observations would allow us to start characterising rocky exoplanet compositions which could lead to new insights for formation models. Furthermore, it would also allow us to model the effects of transient magma oceans though to be present on young earth analogs. Deepening our understanding of how such processes influence the conditions present during later evolutionary stages could give us new insights in the evolution of the earth and the conditions necessary to sustain life.