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TITLE: The Water Content of Exo-earths in the Habitable Zone around Low-mass Stars

ABSTRACT BODY:

Abstract Body: Terrestrial planets in the habitable zones of low-mass M dwarf stars have become the focus of many astronomical studies: they are more easily accessible to detection and characterization than their counterparts around sunlike stars. The habitability of these planets, however, faces a number of challenges, including inefficient or negligible water delivery during accretion. To understand the water content of planets in and around the habitable zone, simulations of the final stages of planet formation are necessary.

We present detailed accretion simulations of wet and dry planetary embryos around a range of stellar masses. We focus on different pathways of delivering water from beyond the snow line to terrestrial planets in the habitable zone. We explore the impact of using either asteroid-like or comet-like bodies, and the effects of a dispersion in snow line locations. We derive the probability distribution of water abundances for terrestrial sized planets in the habitable zone. While these models predict that the bulk of terrestrial planets in the habitable zones of M stars will be dry, a small fraction receives earth-like amounts of water. Given their larger numbers and higher planet occurrence rates, this population of water-enriched worlds in the habitable zone of M stars may equal that around sun-like stars in numbers.

References:

Ciesla, Mulders et al. 2015

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