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The sky is made of lava: how lava worlds reveal their interiors through their atmospheres

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Propositions
accompanying the dissertation

The Sky is Made of Lava

How lava worlds reveal their interiors
through their atmospheres

1. Including volatile elements in melt vaporisation calculations is key to building comprehensive models of hot-rocky exoplanet atmospheres.
(Chapters 4 and 5)
2. Besides looking for the signatures of specific species such as SiO_2 , inferring the composition of a surface melt on a hot-rocky exoplanet may also be achieved by analysing the temperature pressure structure of its atmosphere and determining which species could cause it.
(Chapters 3 and 5)
3. The speciation of volatile species in the atmosphere of a hot-rocky exoplanet could serve as a key indicator for the presence or absence of a lava ocean.
(Chapter 4)
4. The detection of the H^- continuum in the atmosphere of a hot-rocky exoplanet could be used as evidence for the existence of a lava ocean.
(Chapter 5)
5. There is a fundamental difference between the treatment of O_2 partial pressure of a system as a free parameter and one derived from mass law and mass action constraints. The advancement of our understanding of melt-vaporisation will be hindered as long as this schism exists.
6. All vaporisation models suffer from lack of validation with experimental data. Modernising the measurement of and expanding the catalogue of vapour compositions for a range of melts is crucial to the advancement of the field.
7. It is outdated and inefficient to treat exoplanet science and solar-system science as two separate disciplines.
8. Repeatedly publishing poorly supported extraordinary claims does more harm than good to exoplanet science.
9. Not publicly sharing the code with which you produce your models is comparable to not publicly sharing how you set up a lab experiment.
10. The unwritten yet enforced four paper requirement for PhD students pushes capable scientists out of the field, disproportionally affecting people from less privileged backgrounds.
11. Science is a creative process which can only be carried out if scientists have the freedom to take risks.

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