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How does volcanic outgassing differ on geological time scales between planets with and without plate tectonics?

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One of the main factors to assess the possible habitability of a rocky planet (either in or beyond our solar system) is its capability to maintain an atmosphere that allows for moderate temperatures at the surface and would allow water to occur in a liquid form, and that can help shield surface life from harmful radiation.

The existence of an atmosphere depends on several factors - possible accretion from the nebula and catastrophic degassing from the crystallizing magma ocean during planet formation, later delivery of volatiles via comets, sinks of atmosphere gases to the surface or to space, and last, but definitely not least, volcanic release of volatiles from the mantle that where stored in the planet's interior during its formation stage.

For planets of masses not too different from Earth, volcanic degassing plays a major role for the question if the planet could have an atmosphere. Lower-mass planets might not be able to keep an atmosphere but loose it entirely to space, and much more massive super-Earth planets will likely keep the primordial, catastrophically outgassed atmosphere during magma ocean crystallization, and may never be habitable at their surface due to a thick atmosphere rather comparable to Venus. The "Goldilocks zone" for potentially habitable rocky planets is therefore limited to a range from above Mars' mass to a few Earth masses. However, planets of a few Earth masses may not be able to efficiently outgas volcanic gases, if they are in a stagnant-lid regime. This may be different, though, for planets experiencing plate tectonics like Earth, where hot, molten material reaches the surface at plate boundaries and may therefore build up or replenish an atmosphere. The work presented here compares the efficiency of interior volatile depletion and degassing to the surface for rocky planets of different size and composition, either in the stagnant-lid or in the plate-tectonics regime.