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Volcanism on Io

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Io is the most volcanically active body in the Solar System, the result of extensive tidal heating. Observations from Earth and by the Voyager and Galileo spacecraft have revealed the complexities of Io's volcanism. Data from Galileo's visible-wavelength imager have allowed the identification of extremely high-temperature volcanism, and has allowed surface changes to be comprehensively mapped. Analysis of Galileo infrared data has allowed detailed modelling of the thermal emission from Io's volcanoes, resulting in determinations of probable lava composition, mass eruption volumes and coverage rates, and the identification of different styles of volcanic activity, all of which have terrestrial analogues. Galileo data show that the dominant lava on Io is silicate in composition, with sulphur volcanism taking a secondary role, and that Io's surface is covered with sulphur dioxide in differing concentrations and grain sizes. Styles of volcanic activity include different types of lava flow emplacement regime, fire-fountains, pyroclastic deposits, and at least one permanently-active lava lake. This allows comparison between terrestrial and ionian eruptions: ionian eruptions are generally on a much larger scale than their terrestrial counterparts. This overview will summarise what has been learned about Io's volcanism from the Galileo mission and recent ground-based observations.