MOONS

Global Ganymede

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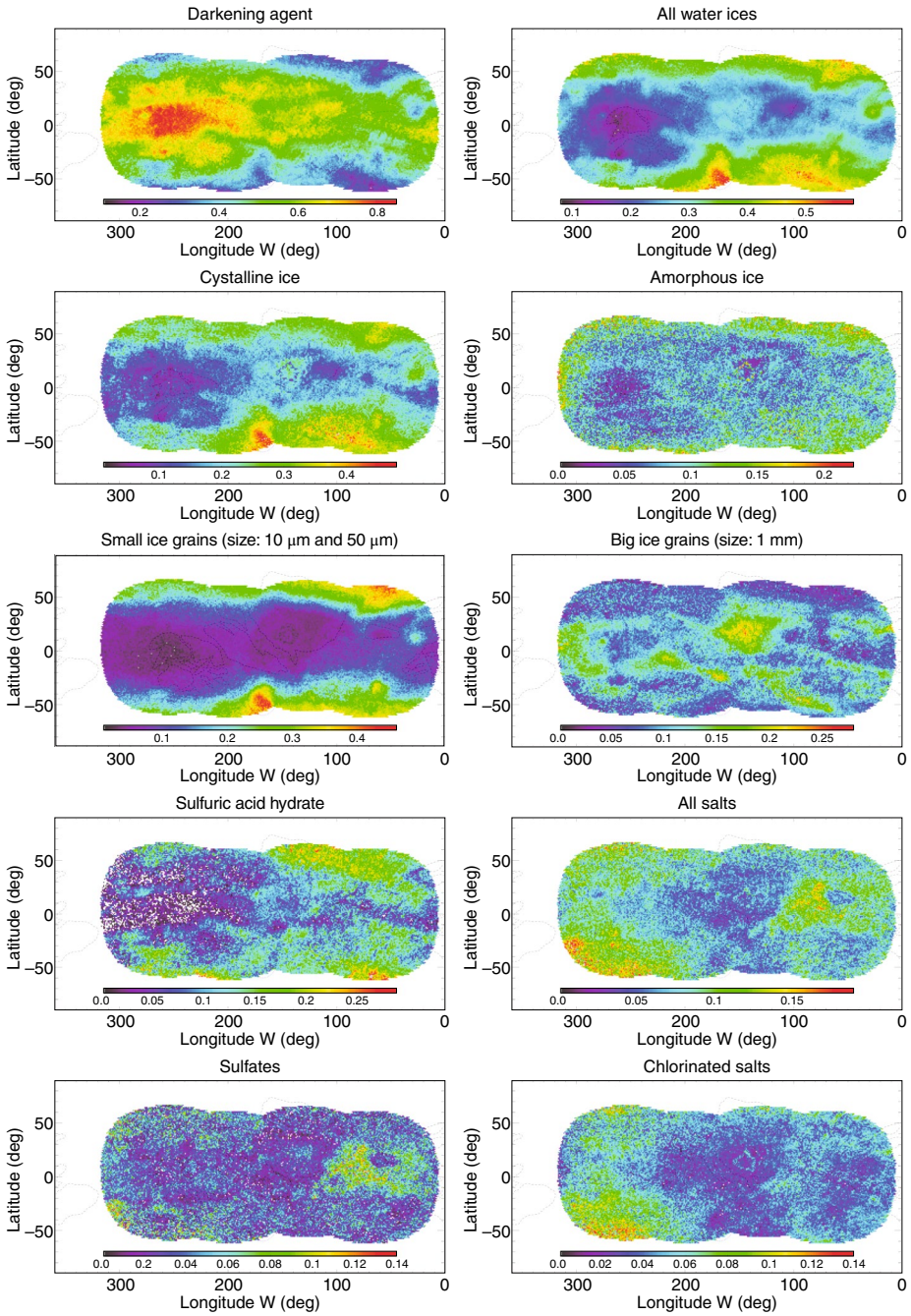

Credit: Elsevier

Jupiter's satellite Ganymede is the largest moon of the Solar System but it does not enjoy the same attention given to other moons like Europa, Titan or Enceladus, despite possessing intriguing characteristics such as plate tectonics, an intrinsic magnetic field (the only Solar System moon with such a property) and an internal ocean. Nicolas Ligier and colleagues obtain spectral maps of almost the whole Ganymede disk, with a spatial resolution of 12.5 × 12.5 mas and a spectral sampling of 5×10^{-4} μm between 1.4–2.5 μm, by using the SINFONI spectrometer at the Very Large Telescope.

Ligier et al. map the main mineralogical components as well as the size of the ice grains (maps showing the per cent abundance of each component are pictured). Water ice and an unknown darkening agent are dominant on the surface, as already known, but the SINFONI high-resolution spectra indicate sizeable amounts (up to ~20%) of hydrated salts and sulfuric acid hydrate. Interaction with Jupiter's highly energetic magnetosphere seems to drive the spatial distribution of most species: water ice, with the polar regions dominated by small grains of crystalline ice and big ice grains concentrated at the equator; the darkening agent, a product of surface sputtering; and sulfuric acid hydrate, also generated by high-energy ions impacting the ice. However, water ice and hydrated salts are also correlated with some geomorphological units like parallel grooves (sulci), indicative of endogenous processes at work like upflows from the underground ocean through the ice shell.

Ganymede will be in the spotlight in a decade or so, as the main target of ESA's JUpiter ICy moons Explorer (JUICE) mission, planned to launch in 2022.

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