Connections of comets to other solar system bodies

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The key molecular and isotopic measurements performed by the ROSINA mass spectrometer aboard the ESA Rosetta spacecraft in the vicinity of Comet 67P/Churyumov-Gerasimenko are used in the aim of attempting to propose a unified view of the formation conditions of the outer solar system bodies. To do so, we compare the known compositions of Titan, Enceladus, and Pluto with that of Comet 67P/Churyumov-Gerasimenko having in mind that these bodies might have formed in different environments that potentially altered or deleted their primordial compositional characteristics. We also compare the Galileo and Juno measurements made at Jupiter and show that the giant planet's building blocks probably did not form in the same region of the protosolar nebula as 67P/Churyumov-Gerasimenko. The Rosetta measurements finally allows us to make predictions of the compositions of the envelopes of Saturn, Uranus and Neptune that will be testable by future planetary entry probes in the coming decades.