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Negative ions at Titan and Enceladus: recent results

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Heavy (up to 13,800 amu) negative ions in Titan's ionosphere were one of the tantalising new results from the Cassini mission as they indicate for the first time the existence of heavy hydrocarbons and nitriles in this primitive Earth-like atmosphere. These ions were suggested (Coates et al, 2007, Waite et al, 2007, Coates et al., 2009a) as precursors of aerosols in Titan's atmosphere and may precipitate to the surface as tholins (c.f. Sagan et al, 1993). Also negative ions, mainly water clusters in this case, were seen during Cassini's close flybys of Enceladus in 2008 (Coates et al., 2009b). We have analysed the negative ion population at both objects. We present our results on the variation of the Titan negative ions with altitude and latitude for some of the relevant encounters so far, and we examine the implications for the negative ion formation process. In addition we present mass spectra from Enceladus showing water clusters and possible additional species.