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Detection of plasmaspheric wind by the Cluster spacecraft, and contribution to the magnetospheric populations

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The existence of a plasmaspheric wind in the Earth's magnetosphere, steadily transporting cold plasmaspheric plasma outwards across the geomagnetic field lines, has been predicted on theoretical basis (Lemaire and Shunk, 1992; André and Lemaire, 2006). Direct detection of this wind has, however, eluded observation in the past. Analysis of ion measurements, acquired in the outer plasmasphere by the CIS experiment on-board the four Cluster spacecraft, provide now an experimental confirmation of the plasmaspheric wind. This wind has been systematically detected during quiet and moderately active conditions, and calculations show that it could provide a substantial contribution to the magnetospheric populations outside the Earth's plasmasphere.