



Combined Cluster/Double Star observations of a close transit across the dayside magnetopause, during a period of quasi-steady reconnection

M.W. Dunlop (1) and the Cluster-DoubleStar Dayside Magnetosphere ISSI team

(1) Space Science and Technology Department, Rutherford Appleton Laboratory, Chilton, Oxfordshire, OX11 0QX, UK (Email: M.W.Dunlop@rl.ac.uk)

The recent launch of the equatorial spacecraft of the Double Star mission (TC-1) has provided an unprecedented opportunity to monitor the low-latitude dayside magnetosphere boundary layer in conjunction with simultaneous observations of the high-latitude boundary layer by the quartet of Cluster spacecraft. During 2004, the Cluster orbit preferentially sampled the equatorward edge of the cusp region in the northern hemisphere and crossed the adjacent mantle region in the southern hemisphere. At the same time, on a number of occasions, the TC-1 spacecraft sampled both the subsolar region of the magnetopause and, often, southerly latitudes. The aim of this talk is to focus on CLUSTER-Double Star conjunctions and in particular we attempt to track the evolution of reconnection signatures, such as FTEs. We present preliminary results of one such situation in which, on 6 April 2004, both Cluster and the Double Star TC-1 spacecraft were on outbound transits through the dawnside magnetosphere. The observations are consistent with ongoing reconnection on the dayside magnetopause, resulting in a series of FTEs seen at both Cluster and TC-1, which appear to lie north and south of the reconnection line, respectively. In fact, the observed polarity and motion of each flux transfer event (FTE) signature advocates the existence of an active reconnection region consistently located between the positions of Cluster and TC-1. Cluster observes consistently northward moving FTEs with +/- polarity, whereas TC-1 sees FTEs of -/+ polarity. This assertion is further supported by the application of a model designed to track flux tube motion for the observed plasma parameters and prevailing interplanetary conditions. The results from this model show, in addition, that the low-latitude, FTE dynamics are sensitive to changes in convected upstream (i.e. magnetosheath) conditions, particularly the IMF clock angle. Changes in the lat-

ter suggest that TC-1 should miss the resulting FTEs more often than Cluster and this is born out by the observations. We also attempt to quantify changes in the structure, thickness and dynamics of the magnetopause boundary layer between the spacecraft locations, correlating these with particular conditions and related magnetospheric response.