



Investigation of the relative roles of the near-Earth and distant neutral lines in flux closure in the Dungey cycle

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The Dungey cycle is the circulation of magnetic flux and plasma within the magnetosphere under the influence of magnetic reconnection at the dayside magnetopause and in the magnetotail. The closure of magnetic flux in the magnetotail is thought to take place at a distant neutral line some 100 RE down-tail from the Earth during quiet times and at a near-Earth neutral line perhaps 10-30 RE down-tail during substorms. However, the relative contribution of these two neutral lines to overall flux closure is unknown, some having argued controversially that the near-Earth neutral line plays the dominant or even sole role. In this study we investigate the nightside reconnection rate using SuperDARN observations of the ionospheric convection and IMAGE FUV observations of the auroral configuration during quiescent and substorm intervals to determine the contributions of the DNL and NENL to the Dungey cycle.