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Understanding the Magnetosphere-ionosphere coupling during two low latitude auroras on 28 February 2023 and 24 April 2023

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Low latitude auroras are seen during large geomagnetic disturbances when precipitation of electrons from the inner magnetosphere occur. Stable Auroral Red (SAR) arcs formed from the overlap region between outer plasmasphere electrons and ring current ions contribute to the 630 nm (red) emission in the equatorward edge of the auroral oval. Broadband flux of low energy electrons from the inner magnetosphere causes red-green auroras at low latitudes. However, the red emissions alone are usually seen because the green emissions are hidden below the horizon. Recent observations of the low latitude auroras at Rikubetsu (magnetic latitude, 34.70 N) in Japan in the rising phase of solar cycle 25 have shown unusual red-green aurora of comparable intensity. Two such events occurred during the geomagnetic storms on 28 February 2023 and 24 April 2023 (F10.7 = 157.9 and 135.5, SymHMin = -161 nT and -233 nT). In this paper, we study the magnetosphere-ionosphere coupling during these events by modelling the plasmopause location using OBM03 model and ring current particle populations using BATSRUS+RAM-SCB model to understand the causative physical mechanisms.