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# Variations of the LLBL thickness under abrupt IMF changes

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A low-latitude boundary layer (LLBL) filled by magnetosheath-like and magnetospheric plasmas can be found at low latitudes along the whole dayside magnetopause and along magnetospheric flanks. The thickness of the LLBL varies from about 0.1 Re near a local noon to about 0.6 Re at the dawn and dusk flanks, however, a very thick LLBL (up to several RE) at the dawn flank was also reported. The thickness increases with increasing distance from the subsolar point and the plasma flow velocity in the anti-sunward direction becomes faster. It was shown that the LLBL exhibits a density plateau rather than a density gradient at the dayside magnetopause and that the LLBL is one of sublayers of the boundary layer. Moreover, some correlation of the LLBL thickness with the interplanetary magnetic field (IMF) orientation (the LLBL is thicker under northward than under southward IMF) and with the enhanced solar wind dynamic pressure were found. We use magnetic field and plasma observations at several points of the LLBL and simultaneous monitoring of the adjacent magnetosheath as registered by THEMIS. The spacecraft configuration allows us to determine the LLBL thickness under different upstream conditions. We focus predominantly on the speed of variations of the LLBL thickness when the IMF orientation changes. We observe that the changes of the LLBL thickness follow immediately the variations of the interplanetary as well as magnetosheath magnetic field directions but the rate of the thickness change is significantly larger for the southward IMF turn.