



Possible Influence of Geomagnetic Activity on Polar Vortex during Stratospheric Warmings: a Case Study

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Major Mid-Winter Warmings onset is defined as the situation, when the usual westerlies in the Arctic at 10 hPa are replaced by easterlies so that the centre of the vortex moves south of 60 - 65°N. The vortex is either displaced entirely or split into two. The dynamic of vortex splitting events is different than in the case when the vortex is merely displaced off the pole. It is supposed that the dynamics of the temperature fields of the winter polar lower stratosphere can be also affected by the geomagnetic activity (Arnold, Robinson; GRL 2001). Therefore, the main aim of this contribution is to determine the influence of the stratospheric polar vortex on the dynamics during the stratospheric warming. For this purpose, 12 Major Mid-Winter Stratospheric Warmings, which occurred in winter months of 1979-2006, were analysed. The analysis showed, that the polar vortex splitting was mostly connected with increased geomagnetic activity (daily $\sum Kp \geq 25$) before and during warming, while the displacement of the vortex centre and its diminution was connected with low geomagnetic activity before and during warming. Increased geomagnetic activity cools down the area of the winter polar lower stratosphere and, therefore, the polar vortex becomes steady and strong; strong polar vortex is usually splitted into two. If the polar lower stratosphere is not cooled by the geomagnetic activity, polar vortex is weaker and its centre is usually only shifted.