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Airborne lidar observation of Polar Stratospheric Clouds during RECONCILE Campaign

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The flight campaign in FP-7 project RECONCILE, took place with high-altitude research aircraft "Geophysica" M-55, during the period January-March 2010, from Kiruna Airport, Sweden. Two backscatter lidars, named MAL1 and MAL2, for "Miniature aerosol lidar" 1 and 2 respectively, were installed on the aircraft and participated in all campaign flights. The lidars are optimal for short-range detection of subvisible clouds above and below the aircraft, in this way they conveniently suited the campaign objectives. The first five campaign flights were performed respectively on the dates: 17.01.2010, 20.01.2010, 22.01.2010, 24.01.2010 and 25.01.2010. During these first five flights the two lidar instruments detected the presence of PCS above and below the aircraft. The altitude of the PSC during the indicated flights was from 17km till 22km, so the flight trajectory crossed them during a number of occasions. This allows the collocation for combined interpretation of the PSC backscatter and depolarization ratios, and the results from the insitu instruments on M-55. As the flight planning and the stratosphere status during those days was such that the flight trajectory was inside the polar vortex, we may associate the PSC only with the synoptic conditions in the Polar Vortex. The backscatter ratio was in the order of 2-4, while the depolarization ratios were in the range of 3-5%. We may interpret such values as indication for absence of ice particles along the flight trajectories. It shall be noted that MAL 1 and MAL2 were operational till the end of the campaign. Anyway, no more PSC were detected after the flight on 25.01.2010.