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# Quantification of Transport and Mixing During the Arctic Winter 2009/2010

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The dynamics of the Arctic winter 2009/2010 were strongly influenced by planetary wave activity. Following a split caused by strong perturbances during December 2009, the polar vortex re-organized and consolidated in January 2010, before a second split lead to enhanced transport of air masses from lower latitudes into polar regions. Later on during March 2010, the vortex re-organized again.

As a result of these strong disturbances the role of mixing in and out of the vortex has been stronger than usual. A transport and mixing simulation with the CLaMS model utilizing a suite of inert tracers tagging the original position of the air masses has been carried out.

The results show a lot of synoptic and small scale features in the vicinity of the vortex boundary, especially long filaments peeling off the vortex edge and being slowly mixed into their mid-latitude environment. The vortex folding events, followed by re-merging of different parts of the vortex led to an enhamced filamentation of the vortex interior. A comparison between CLaMS results and observations made onboard the Geophysica during the RECONCILE campaign shows good agreement. Several areas of strong mixing could be identified, which may help to explain some of the structure observed during the flights. Furthermore, the CLaMS simulations allow for a quantification of the air mass exchange between mid latitudes and the vortex interior.