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Observation of Polar Stratospheric Clouds down to the Mediterranean coast

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Abstract. A Polar Stratospheric Cloud (PSC) was detected for the first time in January 2006 over Southern Europe after 25 years of systematic lidar observations. This cloud was observed while the polar vortex was highly distorted during the initial phase of a major stratospheric warming. Very cold stratospheric temperatures (<190 K) centred over the Northern-Western Europe were reported, extending down to the South of France where lidar observations were performed. CTM (Chemical Transport Model) investigations show that this event led to a significant direct ozone destruction (35 ppb/day), within and outside the vortex as chlorine activated air masses were moved to sunlight regions allowing ozone destruction. If such exceptional events of mid-latitudes PSCs were to become frequent in the future, they should not compromise the ozone recovery because their effect appears to be limited temporally and spatially. More importantly, these events might tend to be associated with the initial phase of a stratospheric warming that results into a weakening and warming of the polar vortex and hence into a reduced probability occurrence of PSC temperatures during the rest of the winter.

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