Comments on "Laboratory Simulation of Atmospheric Motions in the Vicinity of Antarctica"

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The laboratory experiments described by Chen et al. (1993) provide useful insight into the maintenance of the atmospheric circulation around Antarctica. However, we believe that they have seriously misinterpreted a satellite image that they present for comparison with their simulation. The image [taken from Schwerdtfeger (1984), Fig. 17d] is a mosaic of *NOAA-4* infrared scenes covering the high-latitude Southern Hemisphere. It shows a number of cloud bands stretching between midlatitudes and the Antarctic coastline. Closer examination of this image clearly shows that these are frontal cloud bands, associated with midlatitude cyclones that spiral in toward Antarctica as they decay. Chen et al.'s (1993) identification of these structures with *outflowing, anticyclonic-turning* plumes observed in their model is thus incorrect.

The question remains as to whether the plumes observed by Chen et al. in their model do have any counterpart in the "real" Antarctic atmosphere. In general, Antarctic katabatic flows do not propagate for any great distance beyond the foot of the continental slopes although, under certain circumstances, propagation for extended distances is observed (Bromwich 1989). The radius of curvature of the model plumes seen in Fig. 17c of Chen et al. (1993) appears to be many times the inertial radius, indicating that the plume is not simply undergoing inertial adjustment. One might find evidence for such structures in the climatologically averaged flow around Antarctica, which does show significant departures from zonal symmetry (e.g., see Schwerdtfeger 1984, p. 122). However, even if such structures did exist in the Antarctic atmosphere, they are unlikely to be seen on individual satellite images, which will be dominated by cloud signatures associated with baroclinic eddies. Such eddies are not, of course, represented in the laboratory model.

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