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THE SURFACE CLIMATE OF THE EAST ANTARCTIC ICE SHEET BETWEEN DOME A AND THE COAST

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Dome A is the highest point on the surface of the East Antarctic ice sheet and the highest ice feature in Antarctica. In January 2005 a team from the Chinese National Antarctic Research Expeditions (CHINARE) traversed 1228 km from Zhongshan Station to Dome A and located the highest point of the ice sheet (4093 m a.s.l) by GPS survey at 80°22'S 77°21′E. This point is near one end of an elongate ridge (about 60 km long and 10 km wide) which is a major ice divide and has an elevation difference along its length of only a few metres. An automatic weather station (AWS) was deployed at Dome A, and a second station was installed approximately half way between the summit and the coast at a site called Eagle (76°25'S, 77°01'E, 2830 m a.s.l). These AWS are operated as part of an ongoing collaboration between China and Australia which also includes a third AWS (LGB69) at 70°50'S, 77°04'E, 1854 m a.s.l which has operated since January 2002.

More than 12 months of approximately hourly data are now available from the Dome A and Eagle stations, and we use these for a preliminary study of the seasonal cycle of surface climate and its change with ice sheet elevation. The 10-m subsurface firn temperature at Dome A is -58.3°C. This is about 3°C lower than at Vostok, which is almost 600 m lower in elevation than Dome A and where the lowest air temperature (-89.2°C) at the surface of the earth was recorded in July 1983. The coldest air temperature recorded at Dome A during 2005 was -82.5°C. The 10-m firn temperatures at Eagle and LGB69 are -43.1°C and -27.2°C respectively. The available data from the three different ice sheet sites and the coastal station, Zhongshan (69°24'S, 76°24'E, 18 m a.s.l.) where manual observations are made, allow comparison of a range of meteorological parameters including wind and its seasonal and diurnal variability, wind directional constancy, snow accumulation, the strength of the near-surface temperature inversion, atmospheric humidity, solar radiation, and the extent of penetration of Southern Ocean cyclones into the interior of the continent.