Drilling the basal ice at Dome Fuji, Antarctica

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Ice core drilling at Dome Fuji, Antarctica reached 3035.22m depth in January 2007. Though the drill depth had reached 3028.52m in January 2006, the drill team could not continue further drilling in the 2005/2006 season due to lack of time. Drilling was continued during the 2006/2007 season.. It was a big challenge to drill the bottom of the ice sheet. Difficulties arise mainly from the ice temperature very close to the pressure melting point. Heat created by drilling melts the warm ice, and the melt water refreezes later. A thin layer of refrozen ice had been already observed on the surface of the ice core retrieved in the 2005/2006 season. This suggests that the basal melting is taking place at Dome Fuji and that we were very close to the bedrock already in the 2005/2006 season. As drilling went deeper down in the 2006/2007 season, the drill collected ice which seemed to have formed by refreezing of the basal melt water. Solid particles of a few mm in size, was also found in the ice core. These particles are presumably originated from the bedrock. These facts suggest that the drilling has almost reached the bedrock. Here we report on the drilling challenge of the bottom of the ice sheet and characteristics of the basal ice.