

## ***Interactive comment on “A comparison of basal reflectivity and ice velocity in East Antarctica” by R. W. Jacobel et al.***

**E. King (Referee)**

ecki@bas.ac.uk

Received and published: 25 August 2010

This is a well-written paper describing one aspect of the deep-radar data from the 2006–2008 ITASE traverse in East Antarctica. The authors use established analysis techniques to derive the variation in dielectric attenuation in the ice and the relative basal reflectivity along 1700 km of profile from Taylor Dome to the South Pole. This is a valuable contribution that proves for this region what was becoming more and more evident from other studies: that the East Antarctic Ice Sheet has extensive areas of wet bed. While I recommend the paper for publication, it would benefit from some clarifications and technical corrections as described below.

The estimates for dielectric attenuation are derived by several different methods but still fall within a narrow range (7.0 to 11.0 dB/km). The paper would benefit from a

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



brief comparison of these data with the results from the West Antarctic Ice Sheet (e.g. Jacobel 2009); a discussion of the reasons for the differences (largely temperature); and some conclusion about the way temperature varies between Taylor Dome and the Pole (1229:16,17). Is there any correlation between the variation in attenuation (and hence perhaps temperature) and balance velocity or measured velocity?

The presentation of reflection power versus depth (Fig. 2) is done differently to Jacobel et al 2009. In the present paper warm colours represent wet bed whereas the previous paper had cool colours as 'wet'. This is clearly explained and labelled within each paper but allows some degree of confusion when comparing them. The present scheme is more intuitive when comparing the reflectivity data with the balance velocities, so I am not advocating a change, but I think it would be worth a sentence in the text or the Fig. 2 caption pointing out the change from previous practice.

The comparison of relative basal reflectivity and balance velocities is interesting but the difference in the correlation between those data from within the Byrd catchment and those outwith needs a little more care. Bamber et al 2009 states 'The accuracy of the DEM south of 86 S still remains an issue with no immediate solution evident. Balance velocities, and other variables sensitive to slope, such as ice divides, will continue to have a higher uncertainty south of 86 S.' (page 109). Therefore it is not clear to me whether the distinction between blue and red points in Fig. 5 is real or an artefact of the balance velocity model in a poorly-constrained region. The statement at 1232:18 that balance velocities capture well the spatial pattern of fast flow needs modification to account for the additional uncertainty south of 86S.

Technical corrections: 1226:14 remove final a from Antarctica; 1226:18 replace 'across' with 'beneath'; 1227:2 importance not important; 1230:19 replace second 'in' with 'on'; 1232:19 Bamber et al 2000 is not in reference list; Fig. 1 glacier names almost unreadable; Fig. 4 needs a few words to explain the discontinuity at Site 064 (lateral offset of traverse route).

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

Interactive comment on The Cryosphere Discuss., 4, 1225, 2010.

TCD

4, C690–C692, 2010

---

Interactive  
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

C692

