Drainage networks, lakes and water fluxes beneath the Antarctic ice sheet

Ian C. WILLIS, Ed L. POPE, Gwendolyn J.‐M. C. LEYSINGER VIELI, Neil S. ARNOLD, and Sylvan LONG

Supplementary Material

Supplementary Table 1. Known areas (km2; Column B) of 21 lakes (Column A) from the literature (Wright & Siegert, 2012). Also shown are the areas (km2) of the filled sinks (predicted lakes) calculated in the present study by summing all sinks in the subglacial hydraulic potential surface that lie within 10 km, 20 km, 30 km, 40 km and 50 km of the locations of the known lakes (Columns C, F, I, L and O respectively). The differences between the known lake areas and the calculated lake areas are given in Columns D, G, J, M and P. Two overall measures of error are also given for the different calculated lake areas compared with the known lake areas, the root mean squared error (RMSE) and the Pearson’s correlation coefficient (r). Lakes in red are “active” lakes (Smith et al, 2009); those in black are other lakes from Wright & Siegert (2012).

Supplementary Table 2. Calculated water fluxes (km3 a-1) for the 232 lakes listed in Wright and Siegert (2012) that lie within 10 km of a predicted lake that accumulates at least 0.1 m a-1 of melt. The lakes are split into “active” lakes (in red; Column B) and “other” lakes (in black; Column C). Also shown are the overall ranks of the fluxes for the individual lakes (Columns D and E).

Supplementary Table 3. Lake turnover times (years) for the 232 lakes given in Table 2 calculated by dividing the calculated lake volumes by the water fluxes from them. The data are split into “active” lakes (red; Column D) and “other” lakes (black; Column E). Lake volumes are calculated by summing the volumes of all filled sinks that lie within 10 km of the known lake location. On a few occasions, this search radius needed to be increased to 30 km or 40 km to produce non-zero lake volumes, as indicated in Column F. The mean, standard deviation, median, maximum and minimum turnover times are given separately for the active lakes and the other lakes towards the bottom of the table.

Supplementary Table 4. Lake recurrence intervals (years) for a 0.25 km3 flood for the 232 lakes given in Table 2 calculated by dividing 0.25 km3 by the water fluxes from them. The data are split into “active” lakes (red; Column D) and “other” lakes (black; Column E). The mean, standard deviation, median, maximum and minimum turnover times are given separately for the active lakes and the other lakes towards the bottom of the table.