

Interactive comment on “A Lagrangian analysis of the present-day sources of moisture for major ice-core sites” by A. Drumond et al.

A. Drumond et al.

anitadru@uvigo.es

Received and published: 15 April 2016

Please, read our answer for your commentaries. Thank you very much for your review.

*Some ice core sites are widely known (as Vostok) but not all of them, at least for this reviewer. Could the authors add a bibliographic reference for the data of table 1? - We included some examples of studies concerning the ice core sites investigated in the present work. The references were added in the Table 1 of the manuscript.

GISP-2: Meese, D. A., Gow, A. J., Alley, R. B., Zielinski, G. A., Grootes, P. M., Ram, M., Taylor, K. C., Mayewski, P. A., and Bolzan, J. F.: The Greenland Ice Sheet Project 2 depth-age scale: Methods and results, *J. Geophys. Res.*, 102(C12), 26411–26423, doi:10.1029/97JC00269, 1997.

Printer-friendly version

Discussion paper



NGRIP: Andersen, K. K., Azuma, N., Barnola, J.-M., Bigler, M., Biscaye, P., et al.: High-resolution record of Northern Hemisphere climate extending into the last interglacial period, *Nature*, 431, 147-151, doi:10.1038/nature02805, 2004

NEEM: Rasmussen, S.O., Abbott, P.M., Blunier, T., Bourne, A.J., Brook, E., et al.: A first chronology for the North Greenland Eemiam Ice Drilling (NEEM) ice core. *Clim. Past*, 2713-2730, doi: 10.5194/cp-9-2713-2013, 2013.

Monte Logan: Fisher, D.A., Wake, C., Kreutz, K., Yalcin, K., Steig, E., et al.: Stable isotope records from Mount Logan, Eclipse Ice Cores and Nearby Jellybean Lake. Water cycle of the North Pacific over 2000 years and over five vertical kilometres: sudden shift and tropical connections, *Geographie Physique et Quaternaire*, 58, 2-3, 337-352, 2004.

Bona-Churchill: Mashiotta, T.A., Thompson, L. G. and Davis, M. E.: The White River Ash: New evidence from the Bona-Churchill ice core record, *Eos Trans. AGU*, 85(47), Fall Meet. Suppl., Abstract PP21A-1369, 2004.

Wind Dome: Henderson, K. A.: An ice core paleoclimate study of Windy Dome, Franz Josef Land (Russia): development of a recent climate history for the Barents Sea. Diss. The Ohio State University, 2002.

Huascarán: Thompson, L.G., Mosley-Thompson, E., Davis, M.E., Lin, P.-N., Henderson, K.A., Cole-Dai, J., Bolzan, J.F. and Liu, K.-b.: Late Glacial Stage and Holocene tropical ice core records from Huascarán, Peru, *Science*, 269, 46-50, 1995.

Sajama: Thompson, L.G., Davis, M.E., Thompson, E.M., Sowers, T.A., Henderson, K.A., Zagorodnov, V.S., Lin, P.N., Mikhalenko, V.N., Campen, R.K., Bolzan, J.F., Cole-Dai, J. and Francou, B.: A 25,000 year tropical climate history from Bolivian ice cores, *Science*, 282(5295), 1858-1864, 1998.

Grenzgletscher: Eichler, A., Schwikowski, M., Gäggeler, H. W., Furrer, V., Synal, H.-A., Beer, J., Saurer, M., and Funk, M.: Glaciochemical dating of an ice

[Printer-friendly version](#)[Discussion paper](#)

core from upper Grenzgletscher (4200 m a.s.l.), J. Glaciol., 46, 507–515, doi: 10.3189/172756500781833098, 2000.

Everest: Hou, S., Chappellaz, D. Raynaud, Masson-Delmotte, V., Jouzel, J., Bousquet, P. and Hauglustaine, D.: A new Himalayan ice core CH₄ record: possible hints at the preindustrial latitudinal gradient, Clim. Past, 9, 2549-2554, Doi: 10.5194/cp-9-2549-2013, 2013.

Kilimanjaro: Thompson, L. G., Mosley-Thompson, E., Davis, M. E., Henderson K. A., Brecher, H. H., Zagorodnov, V. S., Mashiotta, T. A., Lin, P.-N., Mikhalenko, V. N., Hardy, D. R. and Beer, J.: Kilimanjaro Ice core Records: Evidence of Holocene climate change in Tropical Africa, Science, 298, 5593, 589-593, DOI: 10.1126/science 1073198, 2002.

Byrd: Thompson, L.G., Hamilton, W.L. and Bull, C.: Climatological implications of microparticle concentrations in the ice core from Byrd Station, Western Antarctica, Journal of Glaciology, 14(72), 433-444, 1975.

Epica DML: Ruth, U., Barnola, J.M., Beer, J., Bigler, M., Blunier, T., Castellano, E., Fischer, H., Fundel, F., Huybrechts, P., Kaufmann, P., Kipfstuhl, S., Lambrecht, A., Morganti, A., Oerter, H., Parrenin, F., Rybak, O., Severi, M., Udisti, R., Wilhelms, F. and Wolff, E.: “EDML1”: a chronology for the EPICA deep ice core from Dronning Maud Land, Antarctica, over the last 150000 years, Clim. Past, 3, 475-484, 2007.

Vostok: Petit, J.R., Jouzel, J., Raynaud, D., Barkov, N.I., Barnola, J.-M., et al.: Climate and atmospheric history of the past 420,000 years from the Vostok ice core, Antarctica, Nature, 399, 429-436, 1999.

*The applicability of the method for computing moisture sources has been widely demonstrated in many regions around the world, even for reduced regions. In this work, besides the fact that the horizontal resolution is 1σ and that there are areas with low data density (as Antarctica), the sites are generally located in high altitudes. How

Printer-friendly version

Discussion paper



many particles are typically found in these fourteen locations? - The approximate number of particles found per time step over each of the fourteen locations was included in the table 1 of the manuscript. Stohl and James (2004) state that the estimative of the moisture budget is valid when the number of particles per grid column of the input meteorological data exceeds the number of the layers.

Technical corrections *In page 8 (summary), lines 1-2 and lines 7-9 are repeated. -Thank you. Lines 1-2 were removed from the text.

Please also note the supplement to this comment:

<http://www.earth-syst-dynam-discuss.net/esd-2015-97/esd-2015-97-AC2-supplement.pdf>

Interactive comment on Earth Syst. Dynam. Discuss., doi:10.5194/esd-2015-97, 2016.

Printer-friendly version

Discussion paper

