Table 1: Occurrence of months associated to a $\delta^{18}O$ annual maximum simulated by the ECHAM5-wiso model

Month	January	March	August	November	December
Occurrence	6	2	2	5	2

Table 2: Peak number (as shown in Figure 1), depth (in m snow equivalent), $nssSO_{4,summer}$ (in ppb), MSA (in ppb), and $\delta^{18}O$ (in ‰) for each peak associated to an uncertainty in our dating.

Peak number	Depth (m s.e.)	$nssSO_{4,summer}$ (ppb)	MSA (ppb)	$\delta^{18}O$ (‰)
1	0.54	76.2	4.0	-16.7
2	6.78	109.2	0.2	-15.3
3	12.5	10.4	2.1	-17.9

Table 3: Parameters of the linear relationship of the annual reconstructed accumulations including uncertain peaks 2 ("test2"), 3 ("test3") and both 2 and 3 ("test23") as shown in Fig.1, and the original reconstructed accumulation given in the submitted version ("original), with the simulated accumulation from the ECHAM5-wiso over the same cover period than the resulting reconstructions: the slope, the correlation coefficient ("r"), and the p-value and the standard error ("stderr'). The line in bold highlights the reconstruction which gives the best correlation.

	slope (cm w.e. y^{-1} (cm w.e. y^{-1})$^{-1}$)	r	pvalue	stderr
test2	0.03	0.06	0.82	0.20
test3	0.20	0.36	0.14	0.42
test23	-0.01	-0.02	0.93	0.14
original	**0.28**	**0.45**	**0.07**	**0.22**

Table 4: Parameters of the linear relationship of the $\delta^{18}O$ annual averages including uncertain peaks 2 ("test2"), 3 ("test3") and both 2 and 3 ("test23") as shown in Fig.1, and the original reconstructed accumulation given in the submitted version ("original), with the simulated accumulation from the ECHAM5-wiso over the same cover period than the resulting reconstructions: the slope, the correlation coefficient ("r"), the p-value and the standard error ("stderr').

	Slope (‰‰$^{-1}$)	r	pvalue	stderr
original	0.16	0.32	0.21	0.12
test1	0.14	0.33	0.19	0.10
test2	0.11	0.28	0.25	0.09
test3	0.18	0.37	0.14	0.11
test23	0.11	0.27	0.26	0.09

Table 5: Parameters of the linear relationship of the δ^{18}O annual averages including uncertain peaks 2 ("test2"), 3 ("test3") and both 2 and 3 ("test23") as shown in Fig.1, and the original reconstructed accumulation given in the submitted version ("original), with the near-surface temperature measured at Dumont d'Urville over the same cover period than the resulting reconstructions: the slope, the correlation coefficient ("r"), the p-value and the standard error ("stderr').

	slope (‰ °C^{-1})	r	pvalue	stderr
original	0.59	0.30	0.24	0.48
test1	1.05	0.49	0.05	0.48
test2	0.87	0.36	0.16	0.58
test3	0.57	0.29	0.26	0.49
test23	0.87	0.36	0.16	0.58

Table 6: Parameters of the linear relationship of the $\delta^{18}O$ annual averages including uncertain peaks 2 ("test2"), 3 ("test3") and both 2 and 3 ("test23") as shown in Fig.1, and given in the submitted version ("original), with the simulated temperature by the ECHAM5-wiso model over the same cover period than the resulting reconstructions: the slope, the correlation coefficient ("r"), the p-value and the standard error ("stderr').

	slope (‰ °C^{-1})	r	pvalue	stderr
original	0.10	0.26	0.31	0.10
test1	0.08	0.23	0.38	0.09
test2	0.08	0.27	0.29	0.08
test3	0.10	0.26	0.32	0.09
test23	0.08	0.27	0.29	0.08

Table 7: Percentage of annual precipitation for the summer, from December to February ("DJF"), the autumn, from March to May ("MAM"), the winter, from June to September ("JJAS") and the spring, from October to November ("ON"), within each year from 1998 to 2014 simulated by ERA-interim.

Year	DJF	MAM	JJAS	ON
1998	36.3	29.8	27.1	6.8
1999	26.5	22.4	38.3	12.8
2000	20.1	17.4	48.7	13.8
2001	23.6	36.4	31.2	8.7
2002	34.2	21.2	34.8	9.8
2003	30.8	15.1	47.0	7.1
2004	19.9	32.2	42.5	5.4
2005	20.1	21.3	28.5	30.2
2006	27.3	39.9	25.5	7.3
2007	25.0	37.9	29.2	8.0
2008	19.6	33.9	37.2	9.4
2009	22.7	26.8	47.2	3.3
2010	33.1	22.4	27.5	17.0
2011	38.7	18.6	25.4	17.3
2012	19.0	22.7	48.9	9.3
2013	37.7	23.6	33.4	5.4
2014	33.5	35.6	26.0	5.0