

**Table 3** Pearson chi square tests (equation 6) of the null hypothesis that outliers or persisting errors are distributed randomly between interglacials and other phases of the glacial cycle or in-sample versus out-of-sample. Values are distributed as a chi square with one degree of freedom ( $\chi(1)^2 = 3.84, p = 0.05$ ).

Variable	Interglacials vs. rest of cycle		In vs. out-of-sample	
	Outliers	Persisting errors	Outliers	Persisting errors
Temp	-1.00 [0/3]	2.11 [30/10]	3.0 <sup>+</sup> [0/3]	19.8 <sup>**</sup> [34/6]
CO <sub>2</sub>	0.38 [1/2]	0.18 [4/10]	3.0 <sup>++</sup> [0/3]	2.5 [4/10]
CH <sub>4</sub>	1.37 [4/3]	0.04 [37/111]	7.0 <sup>**+</sup> [0/7]	49.3 <sup>**</sup> [31/117]
Ice	0.66 [2/3]	-0.55 [13/107]	0.2 [3/2]	103.7 <sup>**</sup> [4/116]
Fe	-0.17 [1/4]	0.32 [97/208]	1.4 [1/4]	91.8 <sup>**</sup> [226/79]
Na	0.77 [3/4]	0.10 [74/205]	4.2 <sup>*+</sup> [6/1]	24.2 <sup>**</sup> [172/107]
SO <sub>4</sub>	2.55 [6/1]	0.27 [11/25]	7.9 <sup>**+</sup> [7/0]	40.7 <sup>**</sup> [36/0]
Ca	1.07 [2/2]	-1.00 [0/41]	1.3 [3/1]	24.3 <sup>**</sup> [35/6]
Sea Level	0.04 [1/3]	0.08 [37/105]	0.8 [0/4]	136.3 <sup>**</sup> [73/69]
SST	-1.00 [0/9]	0.07 [166/474]	0.1 [4/5]	9.1 <sup>**</sup> [357/282]
All	0.53 [20/34]	0.10 [469/1296]	0.1 [24/30]	52.5 <sup>**</sup> [972/793]

Test statistics are statistically significantly different from zero at the: \*\*1%, \*5%, +10% level. Blue indicates the out-of-sample simulation is more accurate than the in-sample simulation; red indicate the in-sample simulation is more accurate. Values in brackets indicate the number of outlier/persisting errors in interglacials (or the out-of-sample period) relative to the number of outlier/nonzero mean errors in the other phases of the glacial cycle (or the in-sample period).