July 8, 2024

Proofreading corrections for Petrenko et al., MS No.: egusphere-2023-3126

**Corrections to results of statistical analysis in Table 1**

Please update values in Table 1 to the following:

|  |  |  |
| --- | --- | --- |
| **Difference from Baseline Model** | **Sensitivity** | |
| **3σ (>50% of trials)** | **5σ (>50% of trials)** |
| Linear increase over 7 ka | 6% (7%) | 8% (10%) |
| Step-like increase at 3.5 ka | 6% (7%) | 8% (10%) |
| Impulsive increase lasting 100 yr at 3.5 ka | 190% (240%) | 320% (460%) |

The values also need to be updated in the following locations in the text:

In the abstract (page 1), the sentence starting at the end of line 24 should now read:

“We find that Dome C 14CO measurements would be able to detect a linear change of 6% over 7 ka, a step increase of 6% at 3.5 ka or a transient 100-year spike of 190% at 3.5 ka at the 3s significance level.”

In the table 1 caption (page 10), the final sentence should now read:

“For example, to produce a 3σ detection of a linearly increasing or decreasing GCR flux, the rate of change of the flux must be at least 6% (7%) over 7 ka.”

On page 10, the several sentences summarizing the results (starting on line 34) should now read:

“For a scenario *H*1 where the GCR flux increases linearly with time, and assuming 2% (3%) relative uncertainties in the measured 14CO profile, a flux increase *a* = 6% (7%) over 7 ka is required to produce a 3σ evidence of a non-steady flux in at least 50% of simulated data sets. For a 5σ detection, the rate of change of the flux must be at least *a* = 8% (10%). We also investigated and found similar sensitivities for a scenario involving a step-like increase in the GCR flux at 3.5 ka. Much larger GCR flux changes are required for detection in the impulsive burst scenario: 190% (240%) for 3σ evidence.”

In the Conclusions (page 10), on line 62, 5% should be changed to 7%.

We also need to add a sentence on page 10, line 33, immediately before “The results are reported in Table 1”. The sentence to be added in this location is: “The scenarios start at a common point in model year 0 (≈7 ka) and diverge during the model run (toward present day).”

The following should be appended to the last sentence in the Acknowledgements:

“… and Walter Cook for assistance with the statistical analyses.”