



*Supplement of*

## **A system for analysis of H<sub>2</sub> and Ne in polar ice core samples**

**Eric S. Saltzman et al.**

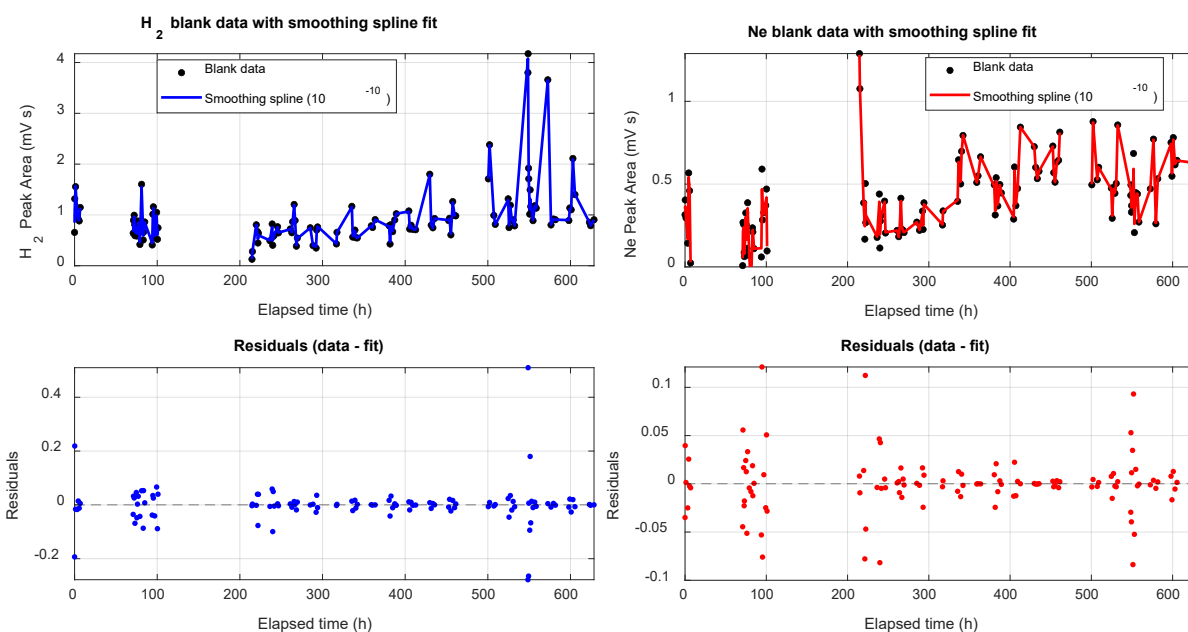
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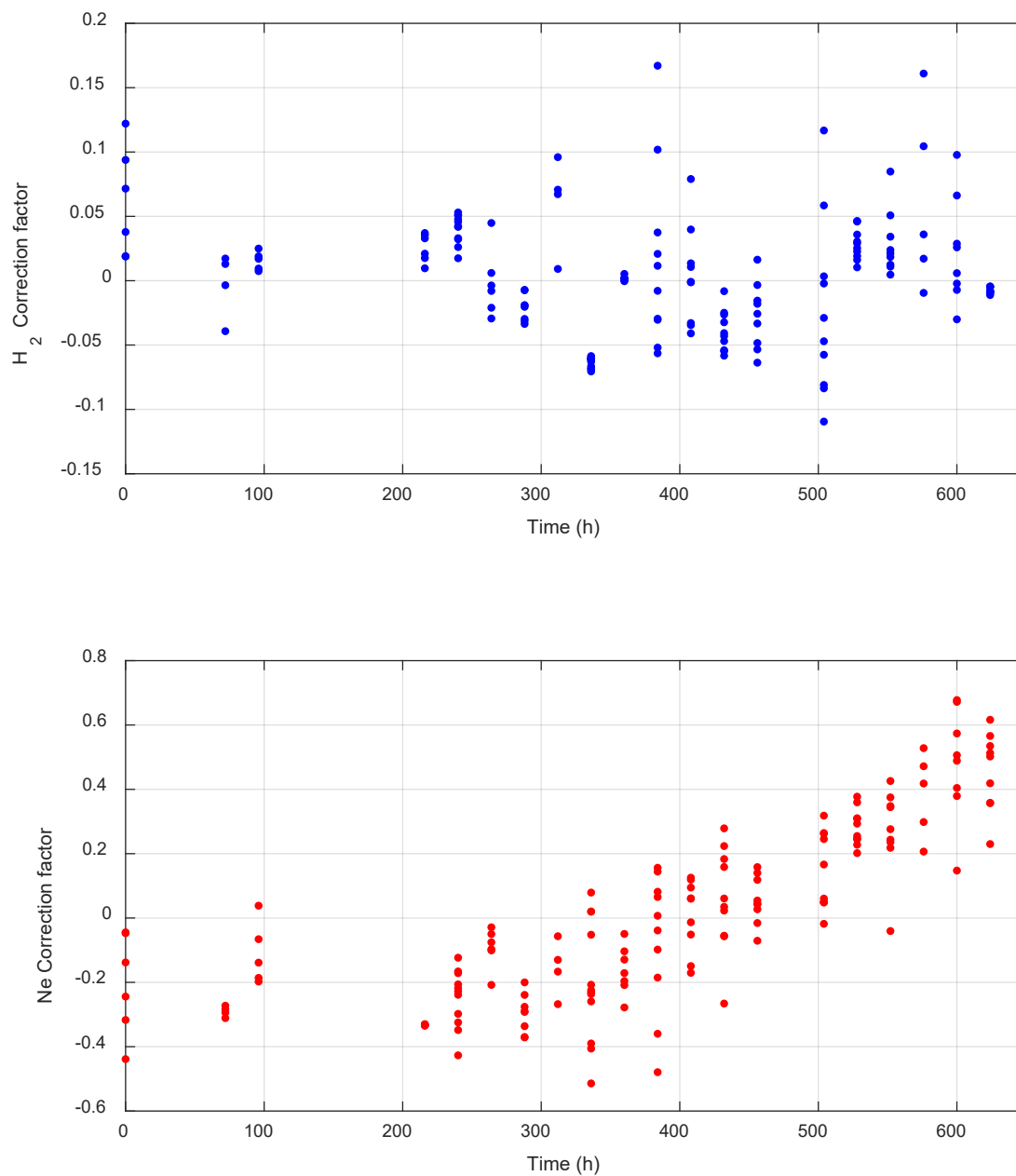
Figure S1 shows the temporal variability in the blanks during the field period (~1 month). A smoothing spline fit was used to interpolate between blanks. The H<sub>2</sub> blank peak areas ranged from 0.1 to 4.1 mV s, with an average of 0.96 mV s. Ne peak area varies from 0.1 to 1.2 mV s, with a blank average of 0.43 mV s.

Figure S2 shows the correction factor applied to the working standards used to compensate for the instrumental drift throughout the field project (~1 month).

We note that the variability in blanks and in system response was much larger during this field deployment than is typical for this system in the laboratory. This was due to a combination of harsh deployment conditions in a tent with highly variable temperatures, and a malfunctioning electronic pressure controller on the detector discharge gas that was not repairable in the field.

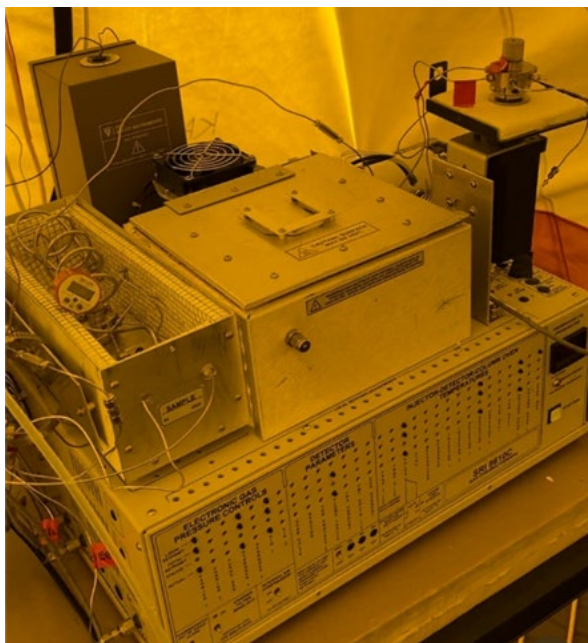


**Figure S1. Temporal variability of system blanks for the 1-month duration of the field project (n=117). Top left blue panel: H<sub>2</sub> blank peak areas (black dots) and smoothing spline (blue line). Bottom left panel: H<sub>2</sub> blank residuals. Top right panel: Ne blank peak areas (black dots) and smoothing spline (red line). Bottom right panel: Ne blank residuals.**

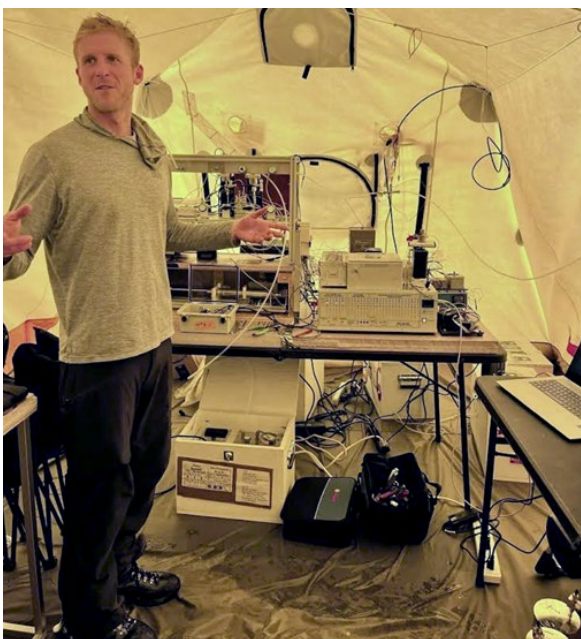


**Figure S2. Correction factors used to compensate for changes in detector sensitivity for the 1-month duration of the field project (n=176). Upper panel: Correction factor for H<sub>2</sub> (blue dots) in the working standards. Lower panel: Correction factor for Ne (red dots) in the working standards. Uncorrected calibration plots in Fig. 7 panels (a) and (c); corrected calibration plots in panels (b) and (d).**

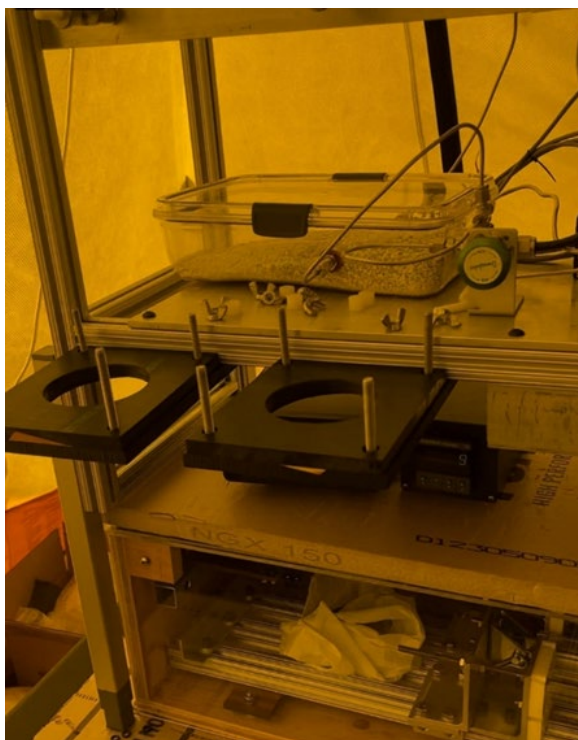
a)



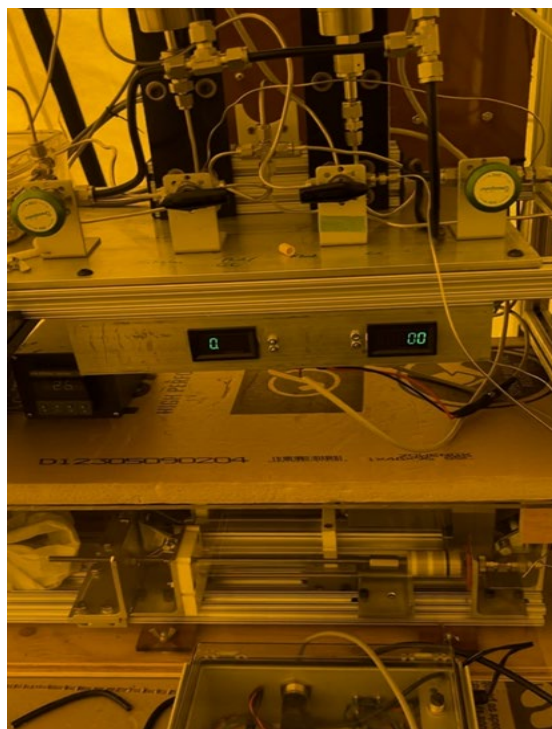
b)



c)



d)



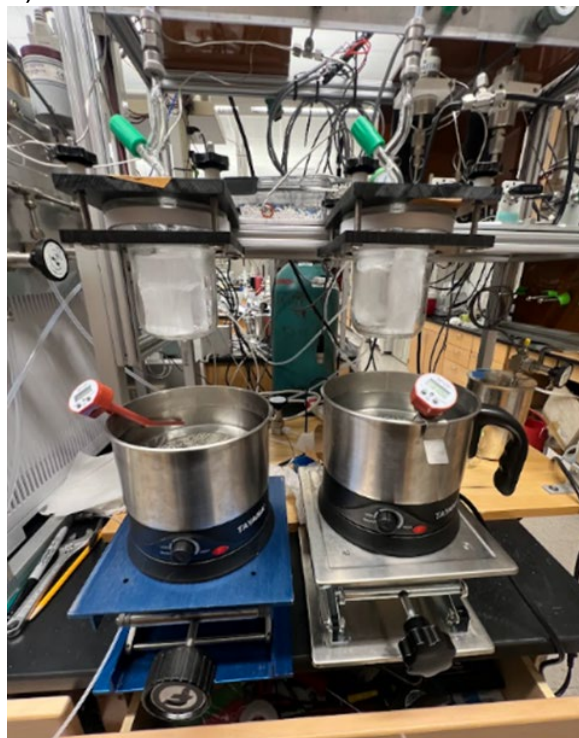
**Figure S3. Images of the instrumentation in the field. a) gas chromatograph with He-PDD detector, b) overall configuration of the extraction line and gas chromatograph with vacuum pump in white box below the table, c) close-up of left side of the extraction system without sample flasks; showing Nafion drier, d) close-up of right side of extraction line showing piston pump and associated electronics. All photos used with permission of John D. Patterson and Murat Aydin.**



a)



b)



c)



d)



**Figure S4. Extraction line in the laboratory. a) extraction line connected to working standards for system calibration, with empty glass flasks, b) glass chambers sealed with ice core samples prior to melting c) close-up of glass flask containing an ice core sample about to be immersed in warm water. The plastic outer ring is visible at the top of the flange, d) top view of the glass chamber. The PTFE inner ring is visible. Used with permission of Miranda H. Miranda.**



**Figure S5. Image of the dilution system showing bellows valves and pump. The Baratron vacuum transducer is mounted behind the panel. Used with permission of Miranda H. Miranda.**