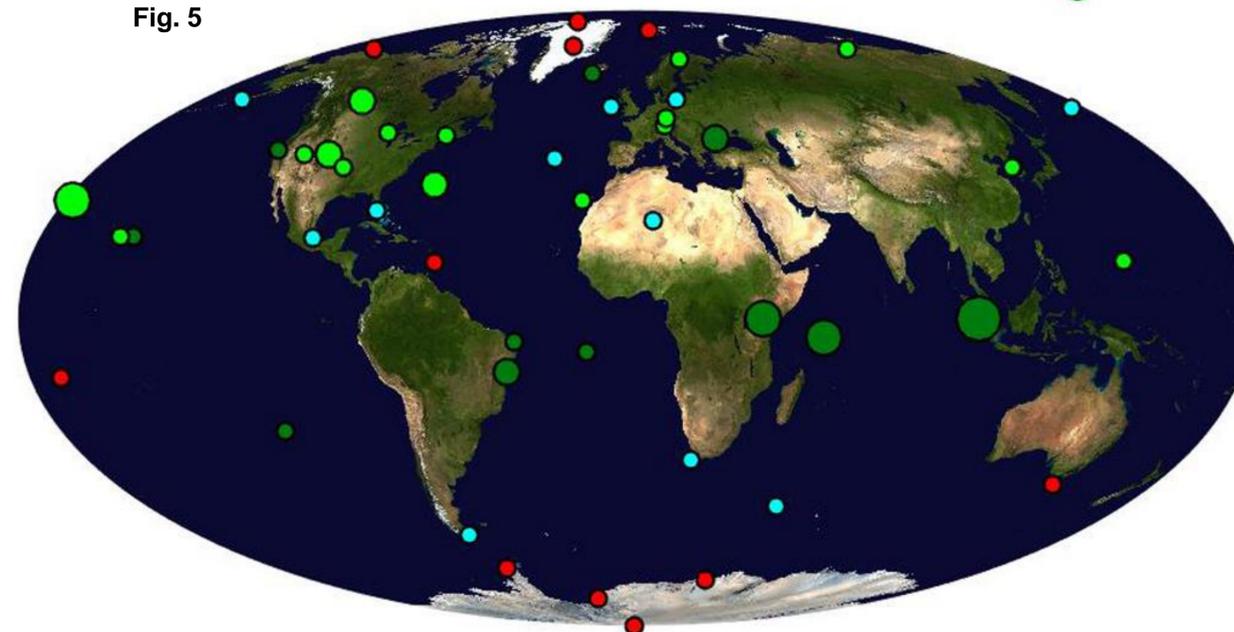


Summary

Two different methods of isoprene monitoring were evaluated from co-collected measurements at the Deutscher Wetterdienst Global Atmospheric Watch (GAW) site, Hohenpeißenberg, Germany. In-situ sampling followed by gas chromatography analysis performed at the site was compared with whole air sampling within NOAA's Global Greenhouse Gas Reference Network (GGGRN). For the whole air sampling, air was collected in 2.5-liter glass flasks that were filled within 15 minutes of the in-situ measurements, and later analyzed by gas chromatography at INSTAAR in Boulder, Colorado. Influences from sample storage time of the flasks, as well as ozone concentration, and humidity during sampling were investigated, but proved negligible. A ~10% systematic disagreement was seen between flask and in-situ methods in calibration scales. A polynomial fit of the compared data was used to correct for this error, scaling flask measurements to the in-situ observations. The detection limit for the flask analysis was determined to be 8 pmol mol⁻¹. This allowed quantification of isoprene in GGGRN network flasks at ~50% of the 44 sites included in the network. We present the global and seasonal distribution of isoprene from these data, where sites were classified as being subjected to year-round, seasonal, occasional, or no isoprene emissions.



Fig. 5



In-situ – Flask Comparisons

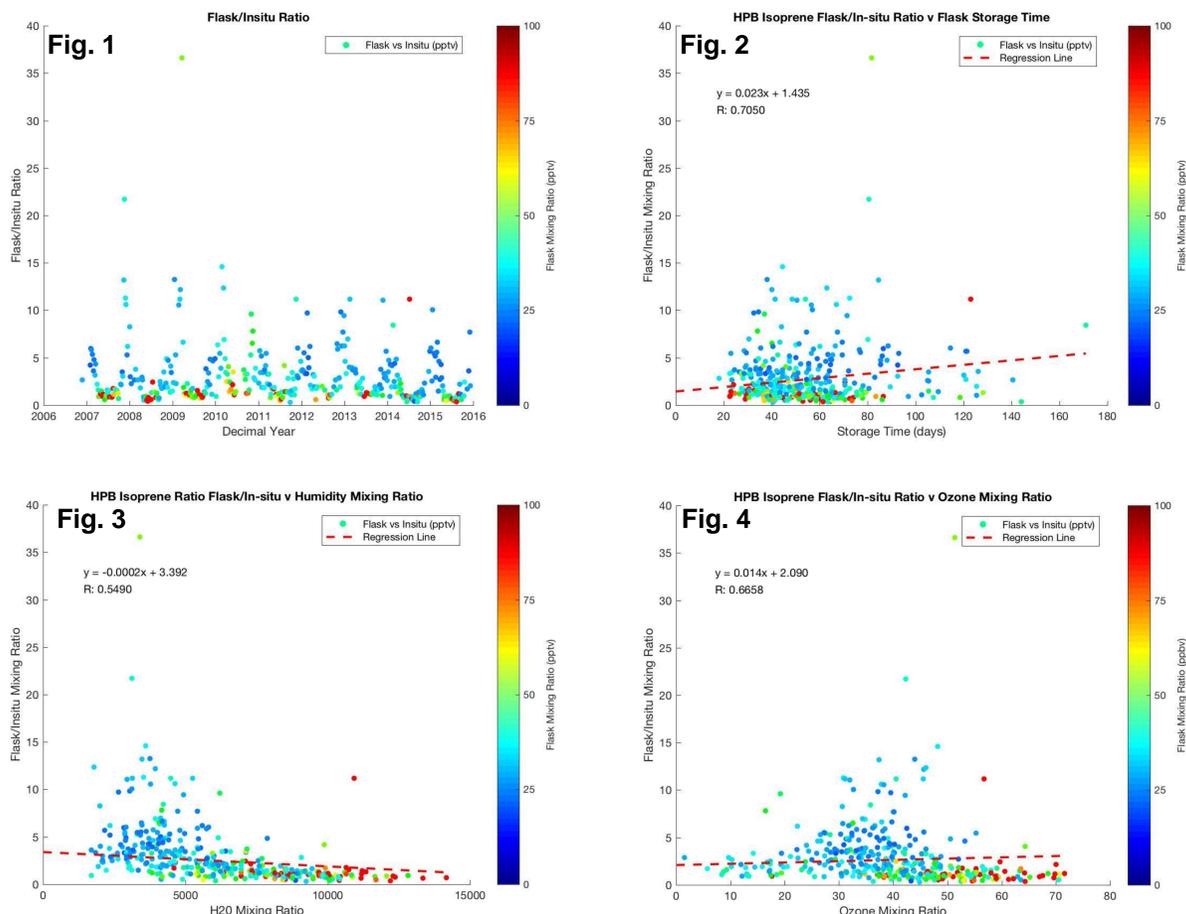


Fig. 6

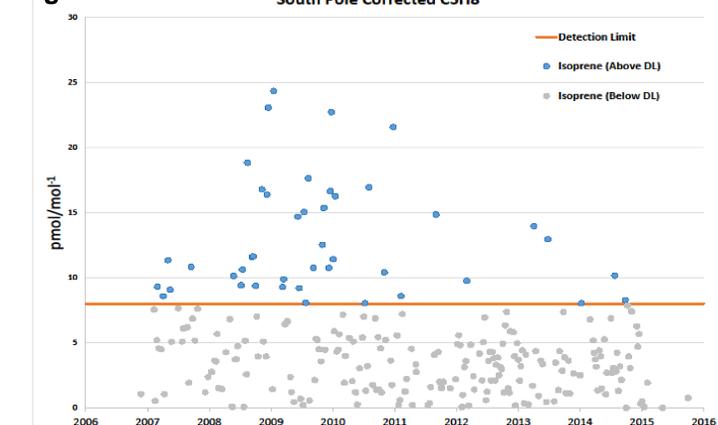


Figure 5: Map showing the global distribution of isoprene at GGGRN network sites. Sites were classified as having no, occasional, seasonal, or year-round isoprene. Point size corresponds to median mixing ratio and categorization (color) to the frequency of isoprene detection at each site.

Figures 6: The detection limit was calculated by assuming that no isoprene should be found at South Pole (Fig. 6). The standard deviation of peaks integrated at the isoprene retention time in the whole record at SPO was taken and multiplied by two, producing a detection limit of 8 pmol mol⁻¹.

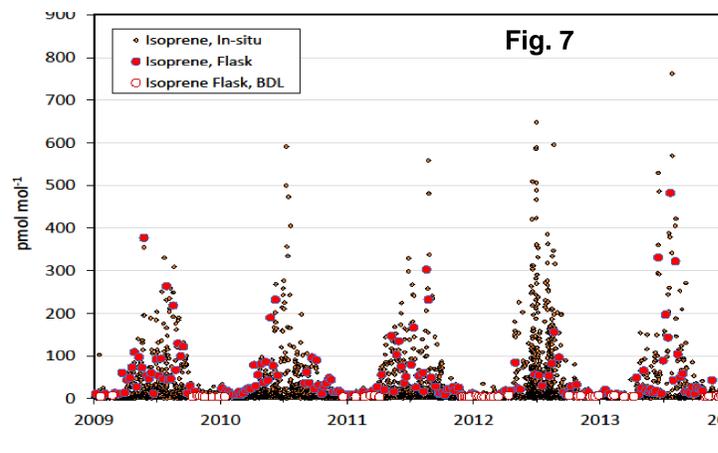


Figure 7: Results from isoprene quantification at Hohenpeissenberg from both programs. Data at or below the detection limit are plotted as open-circles to show how much data falls below the limit of detection.

Figures 1-4: Isoprene flask/in-situ ratios (Fig. 1) were investigated for possible influencing conditions including flask storage time (Fig. 2), humidity (Fig. 3), and ozone at the time of sampling (Fig. 4). Significant correlations were not found, increasing our confidence in the data. The 10% systematic disagreement was corrected for by a polynomial function.