



## **A high precision GC-P-irmMS technique to analyse $\delta D(\text{CH}_4)$ in air entrapped in polar ice cores**

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Bubble enclosures in polar ice cores represent the only direct paleoatmospheric archive. To constrain past methane sources the isotopic composition ( $^{13}\text{C}$  and D) of  $\text{CH}_4$  in high temporal resolution and with high precision is needed.

High precision isotope analyses will be achieved by an online gas chromatography isotope ratio monitoring mass spectrometry technique (GC-irmMS) based on developments by Merritt et al. (1995). The method including pyrolysis (P) of methane and internal isotopic calibration is presented. Features of the extraction system for ice samples covering a melt-refreeze technique and preconcentration of released  $\text{CH}_4$  using cryogenic traps are shown (partly under construction).

Furthermore the importance of knowledge of  $\delta D(\text{CH}_4)$  with regard to past methane concentration rises in concert with (rapid) warming events is highlighted and discussed.