

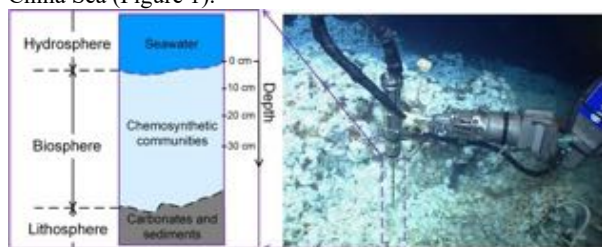
# A new insight into the geochemical analysis of cold seeps in the South China Sea

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## The Method

Based on the previously developed deep-ocean in situ Raman spectrometer with Raman insertion probes for cold seeps (RiP-Cs) [1], we conduct in situ detection for the geochemistry analysis of fluids in the chemosynthetic communities at the Formosa Ridge in the northern South China Sea (Figure 1).



**Figure 1:** The RiP-Cs probe is deployed to acquire the in situ Raman spectra of the fluids at different depth.

## Discussion of Results

The in situ Raman spectra shows that concentration of  $\text{SO}_4^{2-}$  decreases with increasing depth, while the concentrations of  $\text{CH}_4$  and  $\text{S}_8$  increase in fluids, but without  $\text{H}_2\text{S}$  [2]. The findings provide a new insight into the geochemical analysis of the cold seeps.

**Table 1:** Concentrations of  $\text{CH}_4$ ,  $\text{SO}_4^{2-}$  and  $\text{S}_8$  in fluids at different depths.

Depth (cm)	Concentration		
	$\text{CH}_4$ (mmol/L)	$\text{SO}_4^{2-}$ (mmol/L)	$\text{S}_8$ (Relatively)
0	0	29.67±0.41	0
10	6.36±0.11	25.65±0.07	1.18±0.37
20	6.87±0.33	25.05±0.11	11.80±3.01
30	16.88±0.33	18.86±0.41	6.47±0.52

[1] Zhang *et al.* (2017), *Deep Sea Research Part I* **57**, 297-306. [2] Du *et al.* (2018), *G3* **19**, 2049-2061.