



## **Mapping hydrothermal sites and methane plumes off Milos, Aegean Sea: a comparison of ship and aerial surveys**

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Milos probably has the greatest area of active submarine hydrothermalism in the Aegean Volcanic Arc, with an estimated 34 km<sup>2</sup> of active seabed. The first maps of the Milos submarine hydrothermal fields were compiled using ships' echosounders to map gas plumes, with ground-truthing using SCUBA divers and ROVs to collect discrete gas samples. However, intermittent gas bubble release, together with the relatively broad transducer angles, meant that accuracy of mapping the venting areas was limited and time-consuming. Although most of the venting gas was CO<sub>2</sub>, the methane content varied between 0.1% and 9.7% and sufficient methane was present to enable tracing of hydrothermal plumes taking water samples along a grid of stations using Niskin bottles on a CTD sampling rosette. The main hydrothermal plumes, containing methane, lay below the thermocline at approximately 90-160 m depth. Aerial survey data, ATM, 2.5 m, CASI, 2.0 m, and a RC-10 camera for photographic images, was acquired using the NERC ARSF aircraft in May 2005. Aerial photography revealed venting along fault lines both south and east of the island, showing previously unknown sites and providing data for detailed mapping of hydrothermal seepage. The aerial data has led to improved estimates of the venting area off Milos and revealed details of the fault lines through which fluids exited the seabed. The methane flux, released as free gas, from the Milos submarine hydrothermal field, was estimated to be 4000-20000 tonnes a<sup>-1</sup>, with an additional 200-1000 tonnes a<sup>-1</sup> released in venting water.