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Water and gas seepage at the Salton Sea Geothermal System (California, USA)

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The Davis-Schrimpf seep field (Salton Sea, California) represents an ideal site for investigating the activity of hydrothermal systems. At this site, dozens of seeps (gryphons-pools) constantly expel water, mud, gas, and petroleum-fluids. We have conducted a long term monitoring on water and gas geochemistry of fluids erupted as well as annual temperature records. The fluids geochemistry and the temperature vary significantly at closely spaced locations and the water content present in the seeps acts as a key factor. The water salinity varies between fresh (1-3 g/L) in the gryphons, to hypersaline brine (145 g/L) in the pools. The gas emitted by the main vents revealed a composition averagely dominated by C02 (up to 99%) with smaller contributions of CH4. The seep waters represent meteoric waters modified by surface evaporation, with little or no evidence for a deep hydrothermal component. Seep gases, on the other hand, have a deep metamorphic/mantle origin. Temperature monitoring shows that gryphons are dominated by hydrothermal input and the pools by diurnal variations in air temperature. More recently we have conducted a broad investigation of the flux of CO2 and CH4 on a 20x20m meters grid covering a surface of over 20,000 square meters. The survey area extends over the main focussed vents and the results show that a considerable amount of CO2 and is constantly seeping through microseepage. Locally CH4 also exhibits areas with strong microseepage mainly where higher temperatures and surface minerals precipitations occur. These data reveal how important is the effect of microseepage when calculating global budgets of CO2 emissions in hydrothermal fields.