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## **A microcosm at work: preliminary experiments from the MICROBE project**

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**Abstract** – We present a laboratory microcosm which reproduces the gross hydraulic and geochemical characteristics of carbonate reef sediments and allows their non-destructive sampling for geochemical and biological analyses. The microcosm consists of a carbonate reef sediment column connected to an adjacent column containing silica sand. Overlying water can be pumped between the two columns to generate hydrostatic head changes which resemble those over natural patch reefs. Dye tracer experiments indicate that the oscillating head enhances transport of solutes by several times to orders of magnitude over molecular diffusion values. Experiments performed with carbonate reef sediments from the main Hawaiian Islands' reefs illustrate the role of dynamic conditions in controlling the rates of biogeochemically important processes within the sediment column. Oxygen supply to sediments and its subsequent consumption are higher under dynamic water column conditions, whereas under quiescent conditions the column becomes sulfidic.