

**KWAJALEIN ATOLL: A NEW COLLECTION SITE FOR MICROMETEORITES.**

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**Introduction:** Although micrometeorites are constantly arriving at the Earth's surface, they are quickly hidden amongst vast amounts of natural and anthropogenic terrestrial dust. Using magnets, metal-bearing micrometeorites have been successfully separated from deepsea sediments [e.g. 1,2] and dissolved pre-historic (pre-industry) limestones [e.g. 3] and salts [e.g. 4]. However, these samples do not fully represent the incident population of micrometeorites. More complete collections are obtained where the terrestrial dust flux is so low that micrometeorites represent the major dust component and additional separation techniques are not required, for example, from the upper atmosphere by high altitude planes [e.g. 5] or from polar ice, snow and well water [e.g. 6,7,8]. These samples are proving invaluable to understanding interplanetary dust. However, atmospheric collections are captured in silicone oil requiring removal by solvents, which may be problematic to some analyses (e.g. organics), and polar samples have been exposed to water ice [9].

We are evaluating collection of micrometeorites on Kwajalein atoll in the Pacific Ocean, more than 1000 miles from the nearest continent. From mid-December to mid-May, trade winds blow continuously from the northeast at 15 to 20 knots providing a continuous stream of ocean air to sample. The main sources of non-extraterrestrial dust are sea spray and coral, both of which are easily distinguishable from micrometeorites. We report the findings of our preliminary background samples.

**Method:** A high volume air sampler was installed at Kwajalein High School and fitted with a polycarbonate membrane filter with 5µm perforations. The flow rate was set to sample ~100 m<sup>3</sup> of air per hour. Filters were returned to LLNL for survey by optical microscopy. A selection of micrometeorite candidates were picked and analyzed by scanning electron microscopy.

**Findings and Future Work:** The sampler was intended to run for 7 days, but was stopped after only 3 due to clogging of the filters by salt. Despite the short exposure the filter contains 'particles of interest' in addition to background aerosol and analysis results will be presented. NASA funding has been awarded to purchase, modify and install a new air sampler at Kwajalein airport and to design and implement several alternative collectors. These plans will also be presented.

**References:** [1] Fredriksson K. 1956 *Nature* 177:32 [2] Pettersson H. & Fredriksson K. 1958 *Pacific Sci.* 12:71 [3] Dredge et al. 2010 *Scot. J. Geol.* 46:7 [4] Davidson J. et al. 2007 *LPSC XXXVIII* Abstr. #1545 [5] Brownlee et al. 1977 Proc. 8<sup>th</sup> Lunar Sci. Conf. p149 [6] Maurette et al. 1991. *Nature* 351:44 [7] Duprat et al. 2007 *Adv. Sp. Res.* 39:605 [8] Taylor et al. 1998 *Nature* 392:899 [9] Bradley et al. 2011 *LPSC XXXXII* Abstr. #1320

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