**CHASING DUST DEVILS IN CHILE'S ATACAMA DESERT.** S. Metzger[1], M. Kurgansky[2], A. Montecinos[2], V. Villagran[2], and H. Verdejo[2], [1]Planetary Science Institute, Tucson, AZ (metzger@psi.edu), [2]Department of Geophysics, Faculty of Physical and Mathematical Sciences, University of Concepción, Chile.

**Introduction:** We present initial findings from the first dust devil campaign conducted in the Atacama Desert of northern Chile, Nov-Dec 2009. In addition to dust devil activity surveys and ambient meteorology monitoring with 2 Met Stations, we successfully chased and directly sampled over 35 vortices, with approximately half being ideal sysmmetrical core penetrations. Field studies were sited outside of Huara (~80 km from the city of Iquique, Chile) adjacent to a broad flat dry lakebed and inter-fingered mudflows, composed of finely layered clay and silt. A 6-m meteorological mast was mounted in the center (19°59.528′S, 69°41.556′W) of an observational site.

**Instrumentation**: Chase instrumentation consisted of an Applied Technologies 3D Sonic Anemometer, Rm Young 107 Temperature sensor and PPM HAM Aerosol Dust Monitor (0.1 to 10 um sixe range). Several Kestrel 4000/4500 provided pressure data. Radio-controlled Canon DSLRs provided visual records. A Thermal IR camera provided still frames and videos of the sampled dust columns, ideally at the moment of encounter.

The primary Met Station was profiling boundary layer winds and recording soil heat flux. It supported a Campbell Scientific system that included a CR3000 data-logger, four HMP50 temperature and humidity sensors, three Young 05103 wind monitors, one CS106 barometric pressure sensor, one CNR2 net radiometer, one HFP01 soil heat flux sensor and one TCAV averaging soil temperature sensor. Wind speed/direction were measured at heights 0.8, 2, 5.7-m and air temperature/humidity at 0.7, 2, 4, 5.8-m. The net radiometer was fixed at the height of 1.7-m (monitoring 35 $m^2$ of earth surface).

The 2-m station EMA (acronym of Atmospheric Monitoring Station, in Spanish) was a custom-made 16 bit resolution data-logger with Global Water sensors: one WE-100 barometric pressure sensor, one WE300 Licor pyranometer, one WE550 wind speed sensor, one WE600 humidity sensor, and one WE400 temperature sensor.

Several Kestrel 4000 & 4500 handheld weather sensors (wind speed, temperature, humidity and pressure) were used for various ambient measurements, onboard the chase vehicle, and to compare mast sensors.

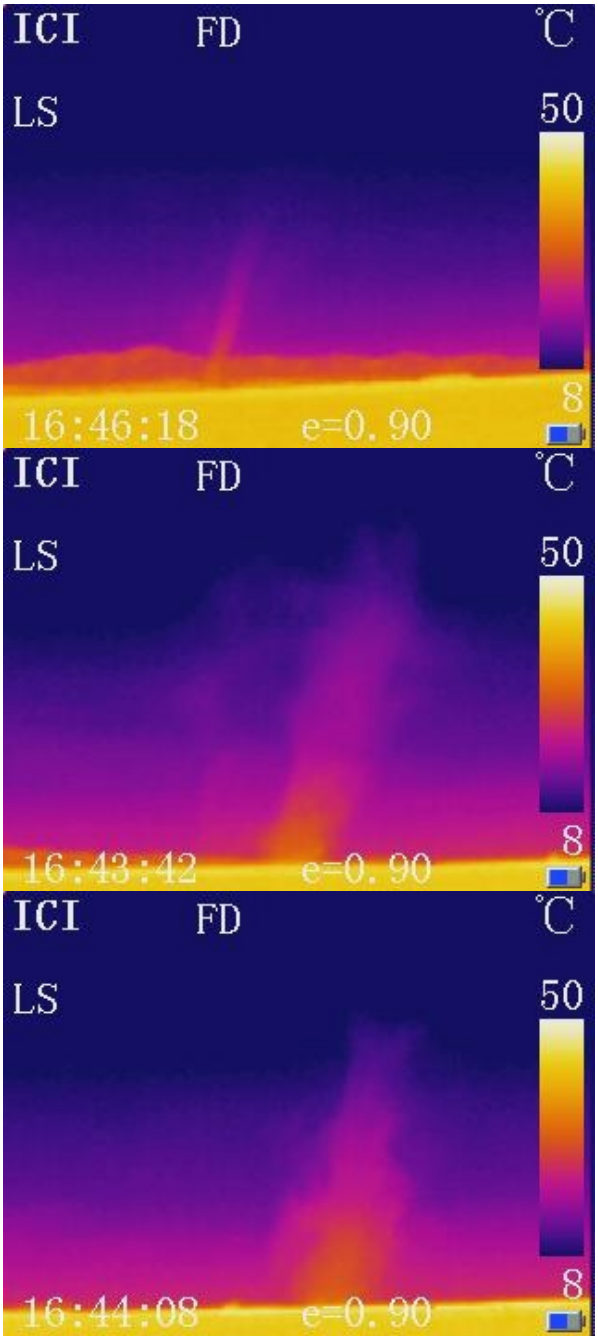
**Data Analysis:** Having returned from the field 3 days before this LPSC Abstract Deadline, only cursory examination of the data has been achieved to date. Detailed analysis of our observations will be presented at the conference. Samples, however, follow;

numerous dust devils formed at 2 to 4 pm, local solar time.

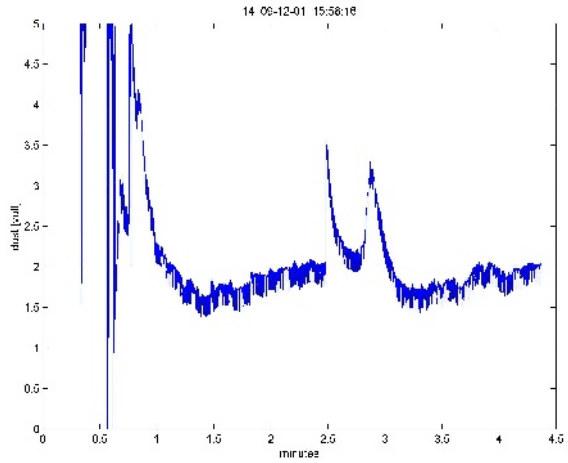
Basal ring of a dust devil crossing dark coarse sand. Diameter approximately 5 m.

Cloud-shadowed disorganized dust devil seen at a distance.

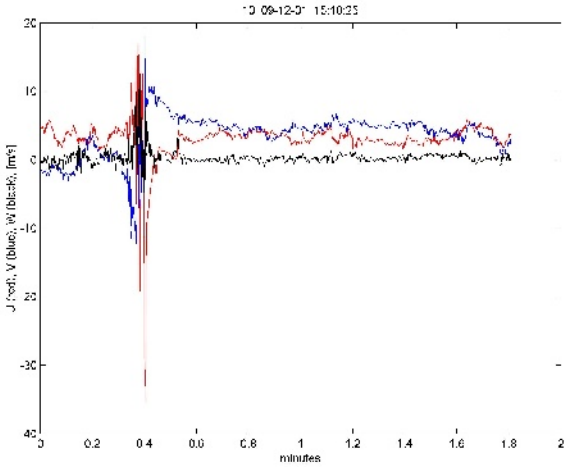
**Acknowledgements.** The work was supported by Fondo Nacional de Desarollo Científico y Tecnológico (FONDECYT), Chile, under grant 1085095. The mini station EMA was assembled in the frame of Project Basal PFB-31/3007 (Chile). We thank Alberto Foppiano, Gloria Reyes, Leonardo Baez, Flavia Burger and Valentina Olmos for indispensable collaboration.




Thermal images of several dust devil thermal vortices.




Dust sensor data that clears shows the 2 peaks which result from passing through the leading and trailing walls of the dust column.




3D Sonic anemometer data from a direct core encounter. Red line is the U-wind component (front-to-back), Blue is the V-component (left-to-right; notice the 180 degree shift in direct as the core passes), and Black is the W-component (up-to-down). All 3 vectors indicate a rapidly buffeting action.