HASP 2013

UND-UNF Payload

Monthly Status Report for November 2013

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UND-UNF team did the following work during November 2013:

The flight data of ozone sensor box#1 were completely analyzed. **Box #1** sensors are nanocrystalline ITO thin film deposited on the glass substrate. Fig.1 (a) to (h) shows the calibration of 8 sensors of box#1 made in the closed chamber at low pressure. All the 24 sensors of box was calibrated simulataneously under indetical conditions of pressure, temepratue and concnetration of ozone in the test chamber. The sensors were calibrated with ozone gas in the range of 0.02 to about 10.00 ppm in the test chamber in the same run. The measured data fit linearly and trendline equations for each plot were determined.

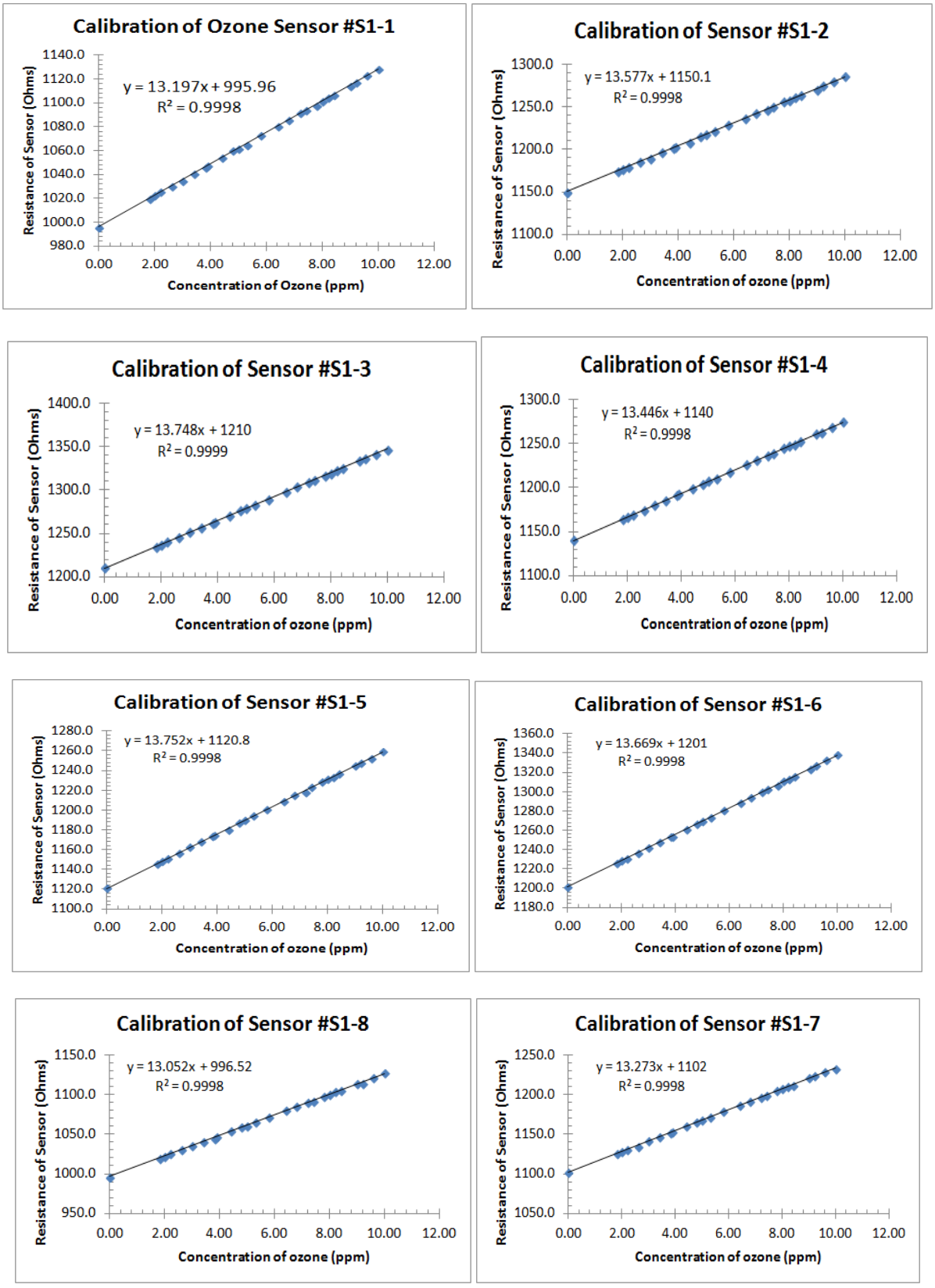

Fig.1 (a) to (h) Calibration of 8 sensors of box#1

All sensors were calibrated three different times and showed nearly the same nature of response each time. Small variations in the slope (m) and y-intercept (b) values were observed due to experimental error.

Using calibration plots shown in fig. 1(a) to (h), the trend line equation of plot of each sensor was applied to convert the resistance values of the sensors into concentration of ozone gas in ppm.

Note that the calibation was made in low pressure, which can be applied mainly to starosphere range. It may not be good for atmosphere data. The ozone concentration measured from 0 to 1.60 ppm may have slight different value of slope and y intercept due to some experimental error and leakage.

The trend line equation of the calibration plot is given as:

$\boldsymbol{y}$ (sensor resistance) = [$\boldsymbol{m}$ (slope). $\boldsymbol{x}$ (concentration of ozone, ppm)] + $\boldsymbol{b}$(y intercept)

The concentration of ozone gas can be determined by: $\boldsymbol{x = (y - b)/m}$

With the trendline equation parameters, the ozone profile plots for box -1 were obtained, which are shown in fig.2 (a) to (h).

The nature of ozone profiles measured by sensor box #1are nearly matched with the theoretically profile measured and quoted by various research groups. The measured value of maximum concentration of ozone was observed from 7.8 to 8.1 ppm, which is very close to the expected values.

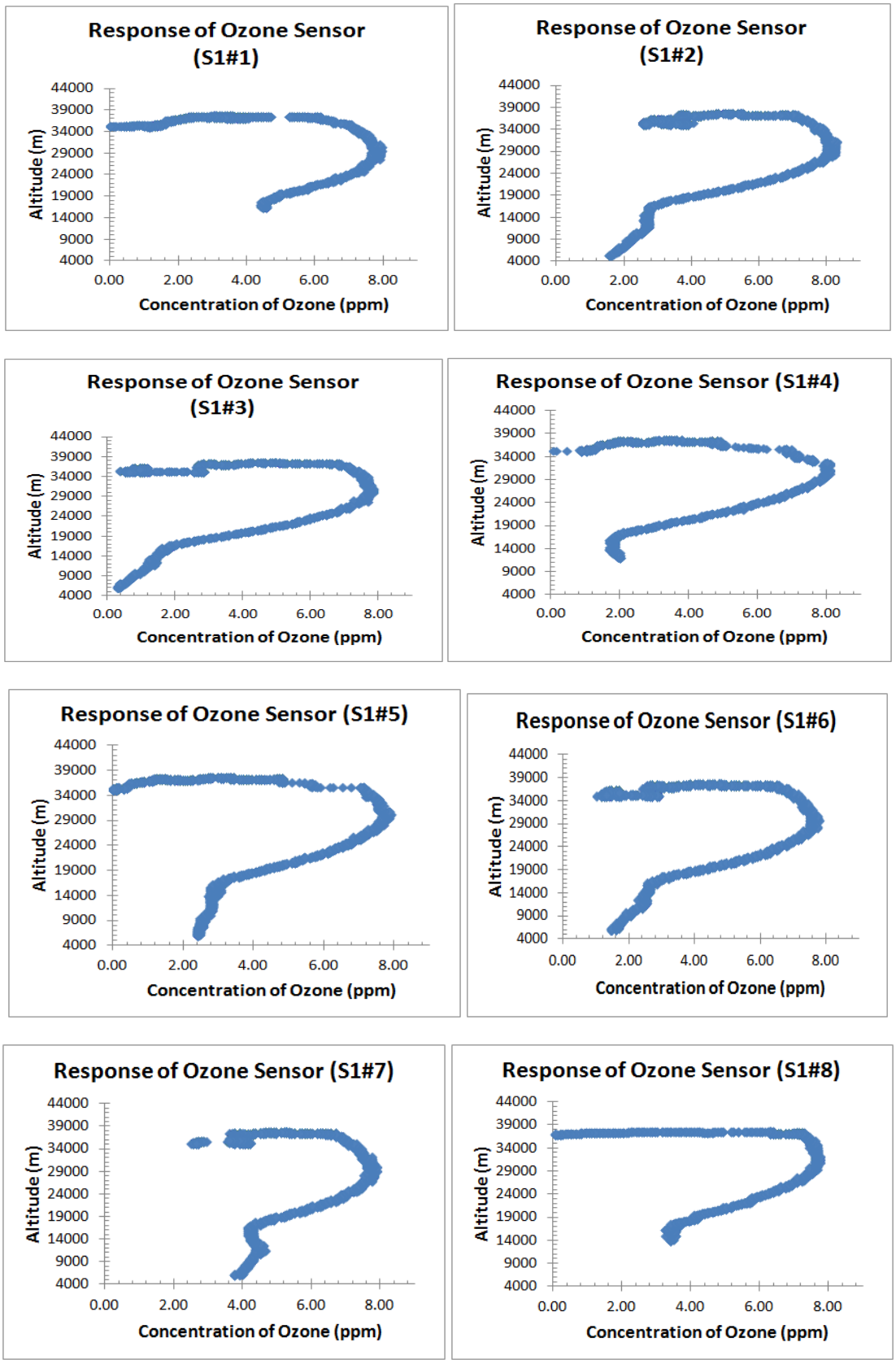

Fig.2 (a) to (h), Ozone profile measured by sensors of box-1

Data analysis of other two sensors boxes is also completed. The final science report will be submitted before due date.

UNF- UND team made a research poster, which was presented by Mr. Ken Emmanuel on November 1, 2013at the University of North Florida. Please refer the attached file for the poster.