Introduction
The purpose of this research project was to investigate how an instrument works, what type of data it gathers, what is needed to compare the data to a reliable source, and to determine if an instrument is valid. Each part of the project uncovered another layer of content that needed to be studied. I wanted to see what knowledge and skills are necessary to successfully bring building and using scientific instruments into an educational environment.

Science Content in Classrooms
Beginning this project I looked at the science content students would bring into an experience to develop an instrument.

Students understand the EM contains a range of light wavelengths that vary in intensity.

So why is this interaction with particles important? How can students study it? How can they be active learners in a science class?

The wavelengths of the light and their intensity can tell scientists quite a bit about the particle types in the atmosphere. The amount of light that is absorbed or scattered is being studied by NASA and other national space agencies.

Examples of data collected

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Time Zone</th>
<th>Pressure</th>
<th>Ozone Corrected</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/05/2014</td>
<td>14:17:31 UTC</td>
<td>06/17/2014</td>
<td>1016.5 mb</td>
<td>AOT 0.651</td>
</tr>
<tr>
<td>06/17/2014</td>
<td>16:18:24 UTC</td>
<td>06/17/2014</td>
<td>1019.8 mb</td>
<td>AOT 0.26</td>
</tr>
</tbody>
</table>

GLOBE Data was collected on sunny, cloudless days at NASA Langley Research Center in Hampton, Virginia. Comparison data was provided by the AERONET network located at the CAPABLE site approximately one kilometer from collection site.

Calculating AOT for GLOBE

To calculate the AOT between instruments measuring with different wavelengths, it is necessary to calculate and use the Angstrom exponent.

References

I would like to thank the following LaRC interns for their support and patience: Robert Bujosa, Stephen Haggard, Cara Moulton and Maricely Ramirez Hernandez.

Acknowledgements

GLOBE and AERONET AOT comparison from 3/24/14 to 6/17/14