Instrument/Model name / PI:

**AMPR (Advanced Microwave Precipitation Radiometer)**
T. Lang, NASA MSFC

Data/Measurements/Retrievals:

- Passive microwave radiometer – Retrieve surface emission, cloud liquid water, precipitation rate, water vapor, ice scattering, and more
- Four frequencies - 10.7, 19.35, 37.1, 85.5 GHz, with 2 variable polarization channels apiece (Channel A: V -> H and Channel B: H -> V)
- Cross-track scanning, polarization state varies according to scan angle

Previous deployments: IPHEx, MC3E, CAMEX 1-4, TCSP, TC4, KWAJEX, TRMM/LBA, TOGA-COARE, FIRE-III, TEFLUN-A

Notable publications:


Instrument/Model name / PI:
**AMPR** (Advanced Microwave Precipitation Radiometer)
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Link to ORACLES science objectives:

<table>
<thead>
<tr>
<th>Data product</th>
<th>ORACLES science objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microwave Brightness Temperatures (10, 19, 37, 85 GHz) – 2 channels per frequency (variable polarization)</td>
<td>O2-3 (Cloud changes due to aerosol-induced heating), O3-2 (Cloud changes due to aerosol mixing) O3-3 (Cloud changes due to aerosol-suppressed precipitation):</td>
</tr>
</tbody>
</table>

Applications: Precipitation & Cloud Microphysical Structure, Ocean Surface Temperature & Near-Surface Wind Speed

Primary Data Examples:

Left: Strip chart time series of $T_B$ for every channel/frequency from 5/23/14 IPHEx flight.

Right: 10 GHz (A) $T_B$ for every TCSP (2005) flight.
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Instrument Requirements:

- **Sampling requirements**
  - All-weather, traditionally flown at high altitudes (e.g., 65 kft) over clouds, can slow down scanning for slower-speed P-3, resolution function of altitude
  - Can provide sea-surface information when under cloud (in-cloud -> ?)
  - Cross-track scanning, polarization varies with scan angle (dual-pol enabled)
  - Real-time data capability with network connection
  - Impact of APR-3 collocation on 37-GHz channel uncertain

- **Coordination with other platforms/instruments**
  - Requirement: Liquid water content/path (LWC/LWP; 0.05 g m\(^{-3}\) / 10 g m\(^{-2}\))
  - APR-3 + AMPR (10 g m\(^{-2}\) LWP) – Retrieval done in post-processing