3. WCL

**WCL Specification:**

<table>
<thead>
<tr>
<th>Transmitter</th>
<th>WCL Power</th>
<th>Depolarization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laser Wavelength</td>
<td>355 nm Nd:YAG</td>
<td></td>
</tr>
<tr>
<td>Pulse Repetition Frequency</td>
<td>20 Hz</td>
<td></td>
</tr>
<tr>
<td>Pulse width</td>
<td>~8 ns</td>
<td></td>
</tr>
<tr>
<td>Pulse Energy</td>
<td>16 mJ</td>
<td></td>
</tr>
<tr>
<td>Receiver</td>
<td>4.5 m</td>
<td></td>
</tr>
<tr>
<td>Diameter</td>
<td>~75 mm</td>
<td></td>
</tr>
<tr>
<td>Field of view</td>
<td>1500 μrad</td>
<td></td>
</tr>
</tbody>
</table>

**Data System:**

- Number of Channels: Two
- Detector: PMT
- Spatial Resolutions: Vertically: 3.75m, 7.5m, 15m, 30m (programmable)
  Horizontally: ~20m
- Data acquisition system: Combined analog and photon counting system from LICEL, GmbH

4. Examples of combined WCL and WCR measurements

**a. Examples from Wyoming King Air:** Mixed-phased altocumulus

- WCR reflectivity
- WCL backscattering
- WCL Depolarization
- 2-DC Concentration
- WCR Ze 
- WCL Power
- WCL Extinction
- Retrieved LWC
- Retrieved Dger
- Retrieved IWC
- Retrieved 2-DC
- Retrievediez

<table>
<thead>
<tr>
<th>Cloud Scale Horizontal Wind Measurement</th>
<th>Cloud Scale Vertical Wind Measurement</th>
</tr>
</thead>
</table>

**b. Examples from C-130 during the ICE-L:** Wave clouds

- Case 1: No ice crystals form before supercooled water
- Wind left to right

- Case 2: Ice crystals form before supercooled water
- Wind right to left

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