Observing Drizzling Marine Stratocumulus
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Introduction

The objective is to gain a better understanding of marine stratocumulus so that forecasts and climate models can be improved.
Can compare seasonal, regional, and day/night variations.
Drizzle affects:
- Radiative properties of the cloud
- Aerosols in and around the cloud
- Boundary layer properties
CloudSat and CALIPSO provide a very large dataset spanning from 2006-present.

Method

- Using the 2B-GEOPROF-LIDAR product
- CloudSat detects any precipitation within the cloud
- CALIPSO detects the cloud whether it is precipitating or not
- So far, data has been collected from 9/1/2006 – 2/16/2009

- North America
  15°N – 40°N
  110°W – 145°W
- South America
  5°S – 30°S
  70°W – 100°W
- Africa
  5°S – 30°S
  15°W – 15°E

- If CloudSat detects any part of the cloud, then it is considered to be precipitating.
- Look at the first layer of clouds with a top height below 2000 m.
- Only consider passes over the ocean.
- Using the 2B-GEOPROF-LIDAR product
- CloudSat detects any precipitation within the cloud
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Percentage of Precipitating Clouds

- The degree to which marine stratocumulus clouds form or precipitate partially depends upon the number and size of the aerosols present.
- Due to radiative cooling, these clouds tend to drizzle more at night.

Seasonal Precipitation

<table>
<thead>
<tr>
<th>Season</th>
<th>Africa</th>
<th>N. America</th>
<th>S. America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>27.61%</td>
<td>25.22%</td>
<td>32.76%</td>
</tr>
<tr>
<td>Night</td>
<td>38.22%</td>
<td>33.15%</td>
<td>48.49%</td>
</tr>
<tr>
<td>Overall</td>
<td>33.08%</td>
<td>29.24%</td>
<td>40.87%</td>
</tr>
</tbody>
</table>

In the Future

- Still many details to work out
- How accurate is this method for determining drizzle?
- Make sure clouds are actually marine stratocumulus
- Combine satellite and buoy data for a specific location
- Compare to model data
- Still many possibilities

Acknowledgements: This research was supported by the DoD Center for Geosciences/Atmospheric Research at Colorado State University under Cooperative Agreement W911NF-06-2-0015 with the Army Research Laboratory.