Lesson Plan

Synoptic Climatology

Week 3

Materials needed: weather maps with specific information.

Objectives:

Basic:

1. concept of synoptic climatology
2. recognize weather station model and read variables
3. know definition of different air masses and source regions
4. concepts of different types of fronts and understand its structure
5. concept of extratropical (middle latitude) cyclone model

Advanced:

1. Describe weather conditions using weather station model
2. Be able to determine different types of air masses given a map
3. Be able to identify different types of fronts and understand its structure and weather conditions associated with them
4. Understanding isobars and weather maps
5. Different areas of synoptic research and applications

Background:

Basic synoptic meteorology concepts is a necessary foundation for synoptic climatology research. The knowledge of weather map and its creation is key to development in synoptic climatology related research.

Introduction to lesson: you learn to read and analyze synoptic weather maps.

Procedure

Pre-Class Individual Activities and Resources (follow the powerpoint notes for material and video)

<table>
<thead>
<tr>
<th>Steps</th>
<th>Purpose</th>
<th>Estimated Time</th>
<th>Learning Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Learn weather station model</td>
<td>Familiarize the station model</td>
<td>45 minutes</td>
<td>Read variable correctly on temp, dew point, pressure, cloud cover, wind direction and intensity</td>
</tr>
<tr>
<td>2. Air masses</td>
<td>Describe different types of air masses and source regions</td>
<td>15 minutes</td>
<td>Be able to identify different air masses given a set of basic variables</td>
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</tbody>
</table>
3. Fronts | Concepts of types of fronts | 30 minutes | Be able to identify fronts and its relationship with air masses

4. Norwegian extratropical cyclone model | Evolution of a cyclone | 30 minutes | Understand the process and relationship with air mass

5. Isobars, isoheights, and weather maps | Concepts of isobars, surface weather maps and upper air weather map | 30 minutes | Be able to interpret weather map and tell what is going on in the atmosphere

In-class Activities

<table>
<thead>
<tr>
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<th>purpose</th>
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<th>Learning Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Read variables and describe weather using a station model</td>
<td>Application of knowledge</td>
<td>5</td>
<td>Reinforce knowledge</td>
</tr>
<tr>
<td>2. Draw a station model using given variables</td>
<td>In depth application</td>
<td>5</td>
<td>Solidify knowledge</td>
</tr>
<tr>
<td>3. Weather map reading</td>
<td>Literacy in weather map</td>
<td>15</td>
<td>Get used to reading surface map</td>
</tr>
<tr>
<td>4. Weather map analyses I.</td>
<td>Identify and draw fronts, label air masses on a surface weather map</td>
<td>15</td>
<td>Application skill development and deep understanding of air masses</td>
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<tr>
<td>5. Weather map analyses II.</td>
<td>The same as above; describe what happened on the cyclone, fronts, and how weather changes at a location</td>
<td>15</td>
<td>Deep understanding of cyclone evolution and weather conditions associated with it</td>
</tr>
</tbody>
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Closure/Evaluation:

Analysis: quizzes will be given and some products of in-class activities will be collected as part of homework grades; results will be discussed during classes, so everyone understand the material.

Post-class activities: review what we practiced in the class if you have not digested them. Prepare for next class’ pre-class activities.

Connections to Future Less Plan: the next class will be on the synoptic climatology research development and applications.