About Me

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* B.S. From Wuhan University in Geographic Information System
Information about this Class

• Office hour:  Monday 10:35 -11:35  ELLSN 4839
• Session:  Monday 14:00 -15:20 ELLSN 3621
• My office:  ELLSN 4829
How will I organize every session?

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<th>Week</th>
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<tr>
<td>Week 1</td>
<td>8/01/2016</td>
<td>Lab: HW1 Review</td>
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<td>Week 2</td>
<td>8/08/2016</td>
<td>Lab: HW1 due, Climate Game</td>
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<td>Week 3</td>
<td>8/15/2016</td>
<td>Lab: HW2 due, Midterm: review</td>
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<td>Week 4</td>
<td>8/22/2016</td>
<td>Lab: HW3 due, go over midterm, Biogeography walk campus</td>
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<td>Week 5</td>
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<td>Lab: HW4 due, Midterm II Review</td>
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<td>Week 6</td>
<td>9/05/2016</td>
<td>Lab: No lab (Labor Day)</td>
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Earth’s axial tilt and season

**Revolution of Earth**
- *Ecliptic Plane*: The plane in which the earth rotate around the sun.

**Rotation of Earth**
- *Earth’s axis*: the rotate axis around which earth rotates.
- *Earth’s Pole*: North Pole and South Pole (the Northern and southern endpoint of earth’s axis).
- *Equatorial Plane*: the plane that is perpendicular to the earth's axis of rotation and midway between its poles.
- *Equator*: the intersection between the surface of earth with the Equatorial Plane.

- **Earth’s axial tilt**: the angle between Ecliptic Plane and Equatorial Plane (23.45 degree)
Earth’s axial tilt and season

Solar elevation angle: the angle between sunlight and the earth surface.
The Tropic of Cancer (Northern Tropic): the most northerly circle of latitude on the Earth at which the Sun may appear directly overhead (Solar elevation angle = 90°).
The Tropic of Capricorn (Southern Tropic): the southernmost circle of latitude on the Earth at which the Sun may appear directly overhead (Solar elevation angle = 90°).

Northern Hemisphere

Southern Hemisphere

Summer

June solstice

Winter

December solstice
Why can a hot air balloon rise after heating the air within the balloon?

- Temperature the of air increases
- The density of air decreases
- The air rises and pushes the balloon upward

*Temperature of air increases* -> *The air will rise*
Land-water circulation cell

- It is also important to keep in mind that **warmer air can have more water vapor in it**. When the air rises, it will lose energy and becomes colder. The colder air can not hold a large amount of water vapor, the extra water vapor will become clouds and condense into raindrops. This is how rain is formed.

- **Convective precipitation**

- If wind is blowing from the water body to the land and the warm moist air is climbing upward along one side of a mountain, the air temperature decreases during this process. What will happen??

- **Orographic precipitation**
Land-water circulation cell

- Initial condition
- Different heating of land v.s. ocean
- Rising warm air
- Land high pressure at higher elevation -> outward flow
- Land surface low pressure -> inward flow
Atmospheric circulation Model

- The coriolis force causes the winds to bend **right** in the **northern** hemisphere.

- The coriolis force causes the winds to bend **left** in the **southern** hemisphere.
Simplified Model of Atmospheric Circulation in Three Dimensions

Conceptual model of global atmospheric circulation pattern showing the major surface pressure belts, the prevailing surface wind systems, the upper-level jet streams, and the Coriolis deflection of surface winds.
Cyclones and Anticyclones
Tropical Cyclones, 1945–2006

Saffir-Simpson Hurricane Scale:
- tropical depression
- tropical storm
- hurricane category 1
- hurricane category 2
- hurricane category 3
- hurricane category 4
- hurricane category 5
Surface Pressure Systems

- Cyclones, or low pressure systems, have counterclockwise (in the N. Hemisphere, opposite in the S. Hemisphere) flow towards the low center, converging.

- Anticyclones, or high pressure systems, have clockwise (in the N. Hemisphere) flow outwards towards lower pressures, diverging.
The schematic continent