

Terrestrial Ecosystems. Earth System Science 218

Mike Goulden, mgoulden@uci.edu; 824-1983

Course description: A mechanistic perspective of the structure and functioning of terrestrial ecosystems. Includes the mechanisms that control plant growth, hydrology and nutrient cycling, and the roles terrestrial ecosystems play in local and global biogeochemistry.

We will meet 3 times per week (Tue and Thur 11:00-11:50; most Fridays at a time to be arranged). Grading will be based on assignments. Except when otherwise noted, you should work alone on the assignments. Some readings will be distributed in class. Suggested readings will be drawn from Chapin et al and Aber and Melillo.

- | | |
|-------------------|---|
| April 13 | Definitions; the properties of terrestrial ecosystems. Leaf gas exchange. Photosynthesis, stomates, energy balance. |
| April 14 | Measure leaf gas exchange (scheduled times). |
| <i>Assignment</i> | <i>Analyze and write-up leaf gas exchange observations</i> |
| April 15 | Finish gas exchange, begin water flow through plants. |
| April 20 | Water flow, begin canopy gas exchange, LAI |
| April 22 | Finish water flow, canopy gas exchange, land-surface energy budget |
| April 23 | Designing instruments, equipment building blocks; Visit marsh to look at tower equipment (meet at marsh) |
| <i>Assignment</i> | <i>Analyze tower data</i> |
| April 27 | Plant allocation, NPP and growth. |
| April 29 | Essential nutrients. Nutrient movement and uptake. Decomposition and nutrient release. |
| April 30 | Introduction to ArcGIS |
| <i>Assignment</i> | <i>Learn ArcGIS</i> |
| May 4 | Ecosystem carbon balance. |
| May 6 | The types of terrestrial ecosystems. |
| May 7 | Controls on the distribution of terrestrial ecosystems. |
| <i>Assignment</i> | <i>Develop conceptual model of ecosystem change</i> |
| May 11 | Current impacts on terrestrial ecosystems. Population growth. Extent of land use change, nutrient input, elevated CO ₂ , species composition, water use. |
| May 13 | Field trip - San Jacinto transect (leave UCI at 9:30) |
| <i>Assignment</i> | <i>Write-up patterns and causes of vegetation distribution along transect</i> |