Geochemistry of Natural Waters

Earth Sciences 315

Section: D100

Term: 2011 Fall

Instructor: Dr. Dirk Kirste
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Discussion Topics: General: This course examines the fundamentals of aqueous geochemistry as applied to natural waters. The emphasis is on developing an understanding of the physical and chemical principles that govern the interaction of water with the geochemical environment. Topics will include water sample collection and analysis, chemical thermodynamics, gas-water-rock interactions, groundwater hydrogeochemistry and geochemical modeling.

Course Topics:
1. Water Quality, Water Sampling and Water Analysis
2. Solutions, Minerals and Equilibria
3. From Rainwater to Groundwater
4. Biological, Physical and Chemical Processes
5. Carbon Dioxide, Acidity, Alkalinity and Carbonate reactions
6. Silicate Weathering
7. Ion Exchange and Adsorption
8. Reduction Oxidation 9. Isotopes
10. Geochemical Modelling

Course Organization: 1 two-hour lecture and 1 three-hour laboratory. The assignments are based on the theory part of the course, and these will be distributed during lab time.

Grading: 1. Assignments 40%
2. Mid-Term Exam 25%
3. Final Exam 35%

Required Texts: Geochemistry, Groundwater and Pollution: Appelo, C.A.J.; ISBN 978-0-41-536428-7 2005. CRC Press

Recommended Texts: Selected Readings:
Drever, J.I., The Geochemistry of Natural Waters: Surface and Groundwater Environments, 3rd Edition, Prentice Hall, 436pp.
Langmuir, Aqueous Enviornmental Geochemistry, Pearson/Prentice Hall, 600pp. Morel and Hering, Principles and Applications of Aquatic Chemistry, Wiley-Interscience, 558pp.

Materials/Supplies: None

Prerequisite/Corequisite: CHEM 122 AND CHEM 126 are pre-requisites and EASC304 is a co-requisite.

Notes: None