

OCN 760 Tracers: their diffusion, transport and reaction
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Spring Semester

Course Description

The course aims to introduce students to the various processes that affect the distribution of tracers in the ocean and atmosphere. The tracers considered range from the purely inert to biologically reactive. The structure of the course is a mix of lectures and directed reading with the content adapted to the needs and desires of the student. Course grades are assessed on (a) your participation in class discussions, (b) your own presentations to the class, and (c) a course journal submitted at the end of the class. The course journal is a statement of the salient points of each of the topics covered. Topics covered include:

Basics

- 3D and 2D turbulent flows
- Energy Spectra

Diffusion

- Random walks
- Eddy diffusivity
- Diffusion by continuous movements
- Anomalous diffusion

Flow topology

- Stretching
- Stable/unstable manifolds
- Hyperbolic points
- Transport barriers

Transport

- Ocean ventilation
- Eddy transport
- Transient tracers
- Tracer age

Reaction

- Excitable and bi-stable systems
- Effects of stirring