



## AN INTRODUCTION TO METEOROLOGY AND OCEANOGRAPHY

## AN INTRODUCTION TO METEOROLOGY AND OCEANOGRAPHY

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| Lecturers : 18.0 | TC : 0.0 | PW : 0.0 | Autonomy : 0.0 | Study : 14.0 | Project : 0.0 | Language : AN

### Objectives

The aim of this course is to provide a physical understanding of large-scale oceanic and atmospheric circulations, and the practical consequences of such systems. Large-scale movements are the result of the interaction between thermodynamic imbalances - driven by solar radiation - and the Earth's rotation. Therefore, these two processes are first studied before being combined to explain the functioning of large-scale meteorological and oceanic systems. The problem of climate change will also be discussed.

**Keywords :** Oceanography, meteorology, currents, waves, tides, solar radiation, Coriolis, Ekman, Froude, Rossby, Sverdrup, Taylor

### Programme

#### 1. Introduction

The composition and the physico-chemical properties of the atmosphere and the ocean. The distribution of water over the surface of the earth.

#### 2. Heat transfer in the atmosphere and the ocean

Solar radiation, radiative exchanges between earth and atmosphere; sensible heat transfer, stratification and stability

#### 3. The effects of rotation

### Learning outcomes

- Understand the different physical processes which drive motion in the atmosphere and ocean
- Be able to identify the different processes involved in the exchange of mass, momentum and heat between the ocean and the atmosphere
- Be able to estimate the importance of different physical processes through order-of-magnitude calculations
- Be able to explain the phenomena represented on a meteorological chart

### Independent study

Objectifs :

Méthodes :

### Core texts

Gill, Adrian, *ATMOSPHERE AND OCEAN DYNAMICS*, Academic Press, 1982

Pedlosky, Joseph *GEOPHYSICAL FLUID DYNAMICS.*, Springer Verlag, 1987

Pond, Stephen. & Pickard, George L. *INTRODUCTORY DYNAMICAL OCEANOGRAPHY*, Butterworth-Heinemann, 1983

### Assessment

Knowledge 50% + Know-how 50%

Knowledge = 40% Final exam + 60% Continuous assessment

Know-how = 40% Final exam + 60% Continuous assessment