Coastal flooding: impacts, conflicts and risks (UPC, 7 ECTS)

Coordinator

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Aims

To present the coastal zone as a dynamic zone submitted to an increase in pressures of use and, thus, with a high level of risk for the infrastructures/activities that "rigidize" it. To present the main driving factors for coastal dynamics in terms of the risk that they produce. To present how the risk does develop, how to manage it and its perception by the "agents" that live at and use the coast.

Description

Introduction. Coastal zone. Estuarine areas. Dynamics and risks. Evaluation of environmental impacts in the marine environment. Environmental control at the costal zone. River flooding risks. Precipitation, floods and river mouth discharges. Erosion and flooding risks at the coastal fringe. Pollution risks. Sources, dispersion and evolution. Vulnerability, resilience and risk. Operational models and services. Risk management.

Teaching staff: UPC staff

Teaching and Learning Methods: Motivation talks with emphasis on
- Problem approach
- Some examples to illustrate the dimension of the problem
- Some examples of results to illustrate the tools to solve the problem

Assessment: Conventional exam and/or a case study, to be chosen by the student or group of students with the agreement of the supervisor (maximum 3), to be resolved at a conceptual level as follows
- Problem
- Approach
- Solution

With an approximate extension of 15 pages corresponding to a workload of approximately 10 hours

Course structure

5. Conventional class activities
6. Optional seminars
7. Personal course work (amount of hours depending on followed seminars). Critical review of the state of art on one of the following subjects:
    a. Probabilistic distributions for two related variables (e.g. waves and mean water level)
    b. Extreme distributions (e.g. for waves)
    c. A hot research issue within the course contents

These subjects will be developed with information from the Catalan coast and with information, if available, from a case study in the country of the participant students.
The structure of the critical review will follow the one suggested below:

i. Introduction
ii. Main aims
iii. State of the art
iv. Future work
v. References

The estimated number of self work hours for this course goes between 80 and 100, depending on the student conditions.

Course Content

- Presentation. Impacts, conflicts and risks
- Coastal risks due to climatic variability

- Impacts on Coastal Zones
- Practical assessment of risk and impact: a case study
- The coastal zone. Estuarine areas. Dynamics and risks
- Flooding and discharges at the river mouth
- Precipitation and flooding
- Sources and decay of pollutants
- Marine flooding and erosion risk
- Wave evolution and wave forecasting
- Risk forecasting. Operational models
- Dispersion and evoluton of pollutants
- Risk assessment. Vulnerability and resilience