UCLouvain

lphys2265

2020

Sea ice-ocean-atmosphere interactions in polar regions

Due to the COVID-19 crisis, the information below is subject to change, in particular that concerning the teaching mode (presential, distance or in a comodal or hybrid format).

5 credits	30.0 h	Q2

This biannual learning is being organized in 2020-2021

Teacher(s)	Fichefet Thierry ;
Language :	English
Place of the course	Louvain-la-Neuve
Main themes	Advanced teaching unit for students interested in physical climatology, whose aim is to prepare for research in this field. The following topics are addressed : large-scale sea ice thermodynamics and dynamics ; characteristics of the atmosphere in polar regions, sea ice'atmosphere interactions ; oceanography of the Arctic and Southern Oceans, sea ice'ocean interactions ; modelling sea ice for climate studies ; sea ice recent variability and future changes.
Aims	**a. Contribution of the teaching unit to the learning outcomes of the programme (PHYS2M and PHYS2M1)** 1.1, 1.2, 1.5 2.3, 2.4, 2.5 3.1, 3.2, 3.3 4.2 5.1, 5.2, 5.3, 5.4 1 6.1, 6.2, 6.3, 6.5 7.1, 7.2, 7.3, 7.4, 7.5, 7.6 8.1 **b. Specific learning outcomes of the teaching unit** At the end of this teaching unit, the student will be able to : 1. describe the major large-scale thermodynamic and dynamic sea ice processes and the main interactions between sea ice and atmosphere and ocean ; 2. model the large-scale sea ice thermodynamics and dynamics based on observations made in polar regions ; 3. asses the performance of a large-scale sea ice model ; 4. argue about the sea ice recent variability and futures changes. - - - - *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** Oral and written presentation of a modelling project (65% of the final mark). Questions during the oral presentation of the project on the topics addressed in the theoretical course that are related to the project (35% of the final mark). If the sanitary conditions deteriorate, the modalities of teaching and evaluation will be reassessed according to the situation and the rules in force.
Teaching methods	**Due to the COVID-19 crisis, the information in this section is particularly likely to change.** Lectures and/or flipped classroom. Sea ice modelling project conducted in group. The slides presented during the theoretical course are available on MoodleUCL.
Content	1. General characteristics of sea ice 2. Formation, growth and properties of sea ice 3. Sea ice thermodynamics 4. Sea ice kinematics and dynamics 5. Sea ice thickness distribution 6. Snow on top of sea ice 7. The polar atmosphere and its interactions with sea ice 8. The Arctic and Southern Oceans and their interactions with sea ice 9. Sea ice in global climate models

	10. Sea ice recent variability and future changes
Bibliography	Thomas, D.N. (Ed.), 2017 : Sea Ice. John Wiley & Sons, Chichester, U.K., 652 pp. Untersteiner, N. (Ed.), 1986 : The Geophysics of Sea Ice. NATO ASI Series, Series B : Physics Vol. 146, Plenum Press, New York, 1196 pp.
Faculty or entity in charge	PHYS

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Aims
Master [120] in Geography : Climatology	CLIM2M	5		
Master [60] in Physics	PHYS2M1	5		
Master [120] in Physics	PHYS2M	5		