Module name	**Feedbacks between land surfaces and the atmosphere**
Module number	CMS-TRK-ES2
Senior Lecturer	Prof. Dr. Matthias Mauder matthias.mauder@tu-dresden.de
Qualification objectives	Students are familiar with the system and modelling of small scale land surface processes and are able to describe complex interactions in the Soil-Plant-Atmosphere system using simple models.
Contents	The content of the module is the energy interactions and feedbacks between the upper soil, the plant space and the atmosphere, coupling measures, analytical approaches and micro-scale models to describe the interactions.
Forms of teaching and learning	The module includes lectures of 2 SWS, exercises of 1 SWS and self-study. The teaching language of lectures and exercises may be German or English and will be specifically determined by the teacher at the beginning of each semester and announced in the usual manner.
Eligibility for participation	Knowledge of physical processes in the atmosphere and hydrosphere at bachelor's level and knowledge of physics and mathematics at basic level of abitur is required.
Usability	In the Masters Course Computational Modeling and Simulation, the module is an optional module in the Track Computational Environmental Science and Engineering, to be selected in accordance with Annex 2 to the Specific Examination Regulations. The module cannot be chosen in the Master's Course Computational Modeling and Simulation if this or a module with substantially the same content from a Course with which the entry conditions under § 3 of the Studienordnung have been met has already been completed. The module provides the pre-requisites for the modules it designates under the pre-requisites for participation.
Conditions for the award of credits	Credits are awarded when the module test is passed. The module test consists of a 90-minute away day. The language of the test will be English.
Credits and marks	The module allows 5 credit points to be obtained. The module score corresponds to the test performance score.
Frequency of the module	The module is offered every summer semester.
Workload	The total workload is 150 hours.
Duration of the module	The module covers 1 semester.

Module name	**Geodetic Space Techniques for Climate Research**
Module number	CMS-TRK-ES3
Senior Lecturer	Prof. Dr. Martin Horwath martin.horwath@tu-dresden.de
Qualification objectives	Students understand the theoretical background and functioning of geodetic space techniques, such as satellite geovimetry, satellite altimetry and Global Navigation Satellite Systems, for applications to determine mass redistributions in the earth system, determine changes in surface geometry of ocean, solid earth and ice, and changes in atmospheric parameters in the context of current climate science. They are able to analyse some standard geodetic spatial data products and to explore new aspects of geodetic spatial methods for climate science.
Contents	The module shall include gravitational field determination by satellite gravimetry, determination of mass redistributions in the Earth system from temporal changes in the gravitational field, data analytics aspects for the Mission GRACE (Gravity Recovery and Climate Experiment) and its successor missions, data analytics aspects for determination of ice, ocean and water surface height and height changes by satellite altimetry, basic principles and specific evaluation aspects of different applications of Global Navigation Satellite Systems for Climate Research signals measurements, and remote sensing imaging applications for determination of surface geometry changes.
Forms of teaching and learning	The module includes lectures of 1 SWS, exercises of 1 SWS, seminars of 1 SWS and self-study. The teaching language of lectures, exercises and seminars may be German or English and will be specifically determined by the teacher at the beginning of each semester and announced in the usual manner.
Eligibility for participation	No knowledge is required.

Usability	In the Masters Course Computational Modeling and Simulation, the module is an optional module in the Track Computational Environmental Science and Engineering, to be selected in accordance with Annex 2 to the Specific Examination Regulations. The module cannot be chosen in the Master's Course Computational Modeling and Simulation if this or a module with substantially the same content from a Course with which the entry conditions under § 3 of the Studienordnung have been met has already been completed. The module provides the pre-requisites for the modules it designates under the pre-requisites for participation.
Conditions for the award of credits	Credits are awarded when the module test is passed. The module test consists of a non-public oral test performance as a group test lasting 30 minutes. The language of the exam will be German or English, at the student's choice.
Credits and marks	The module allows 5 credit points to be obtained. The module score corresponds to the test performance score.
Frequency of the module	The module is offered every summer semester.
Workload	The total workload is 150 hours.
Duration of the module	The module covers 1 semester.