

Master Program

Earth and Climate System Science (ECSS)



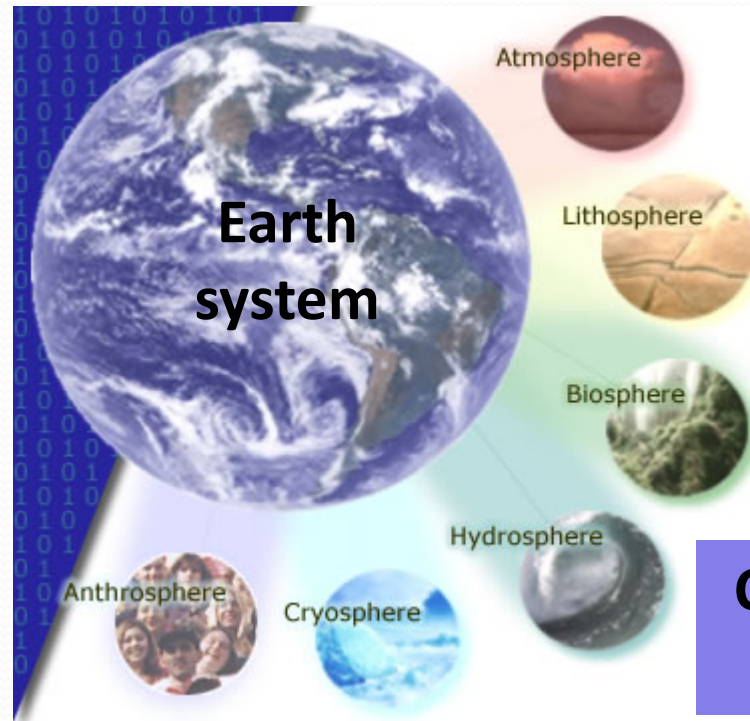
Institute of Physics and Meteorology (IPM)

Dr. Andreas Behrendt

Planet under pressure: The Anthropocene

Food security
and health

Land use
(desertification,
deforestation)



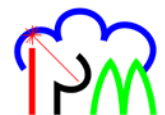
Population
growth

Energy
production
and demand

Climate variability
and change

Socio-economic and political development

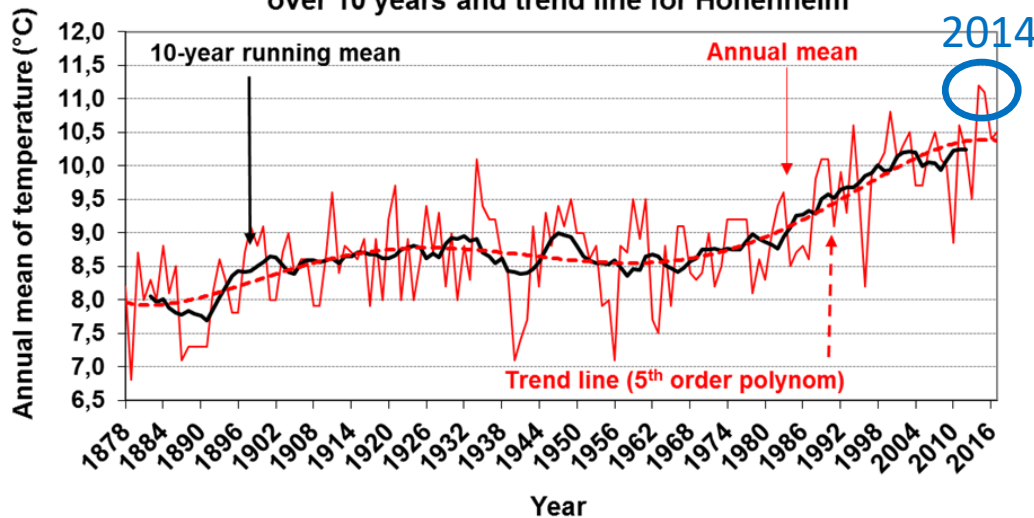
Vision: equitable, sustainable development



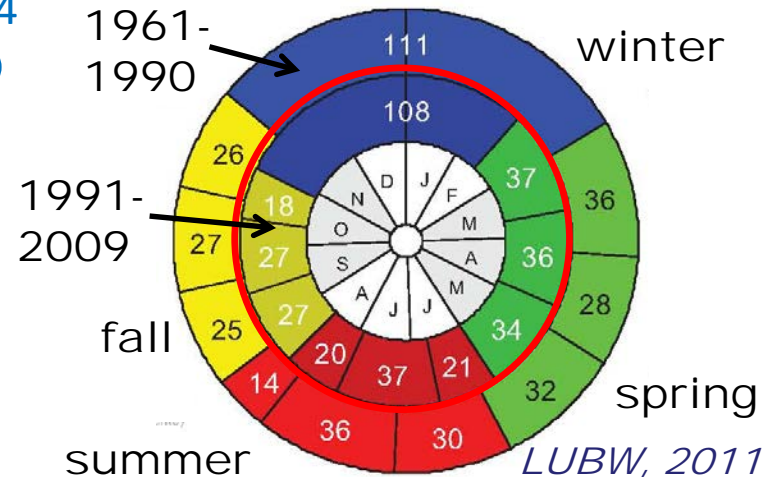
University of Hohenheim Climate Station



2 m annual mean air temperature (1878-2017), running mean over 10 years and trend line for Hohenheim

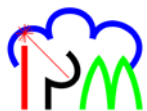
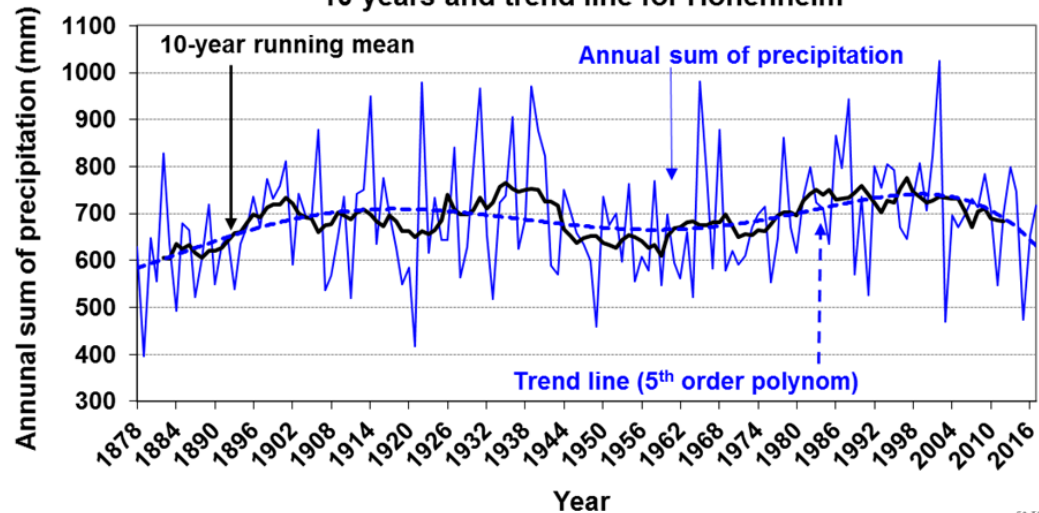


Phenological clock for Aalen



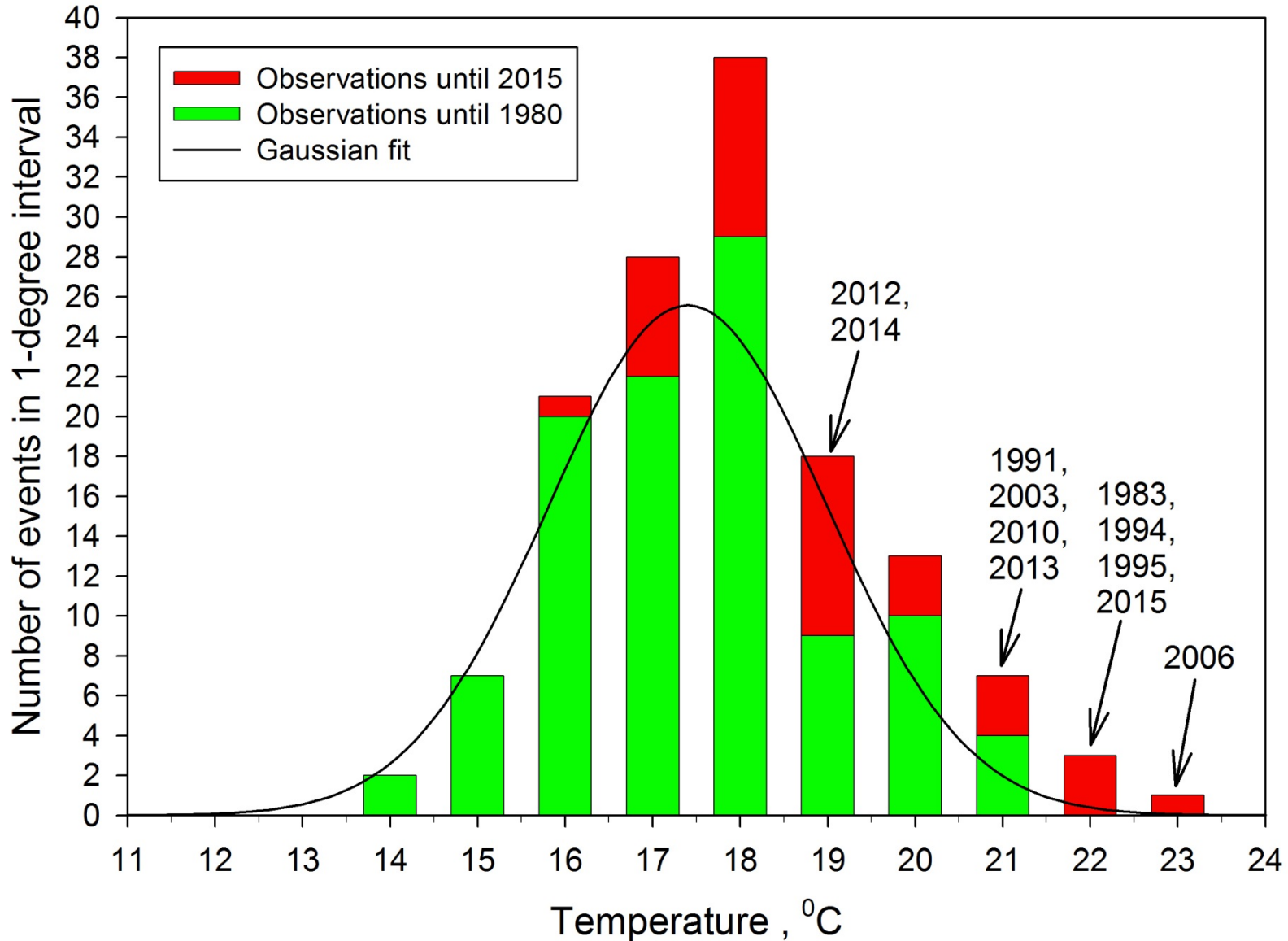
In southern Germany, climate change is not only visible in temperature but also in the response of vegetation.

Annual sum of precipitation (1878-2017), running mean over 10 years and trend line for Hohenheim

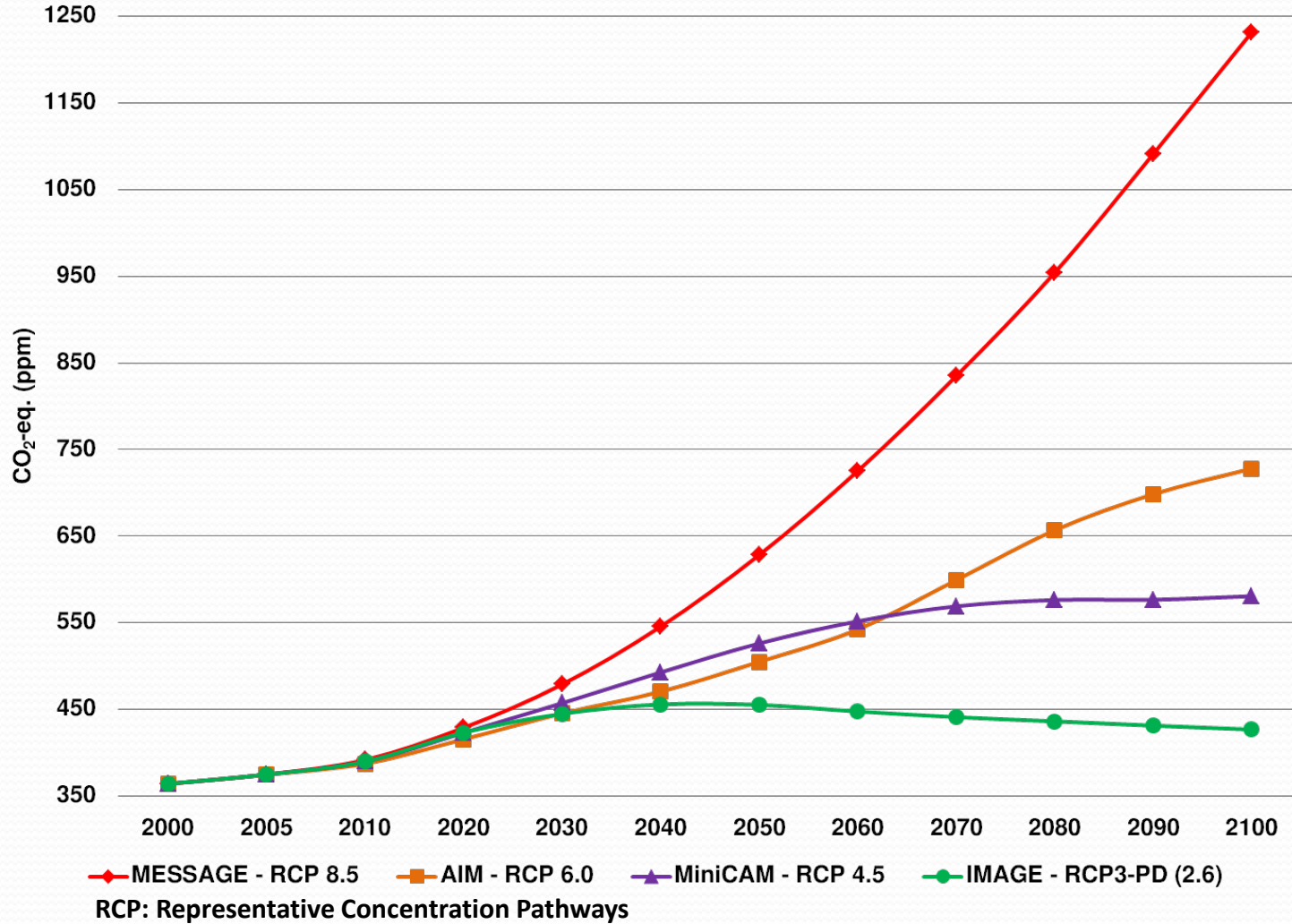




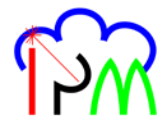
Analysis of the mean temperature in July between 1878-2015 measured at the Climate and Weather Station of the Institute of Physics and Meteorology



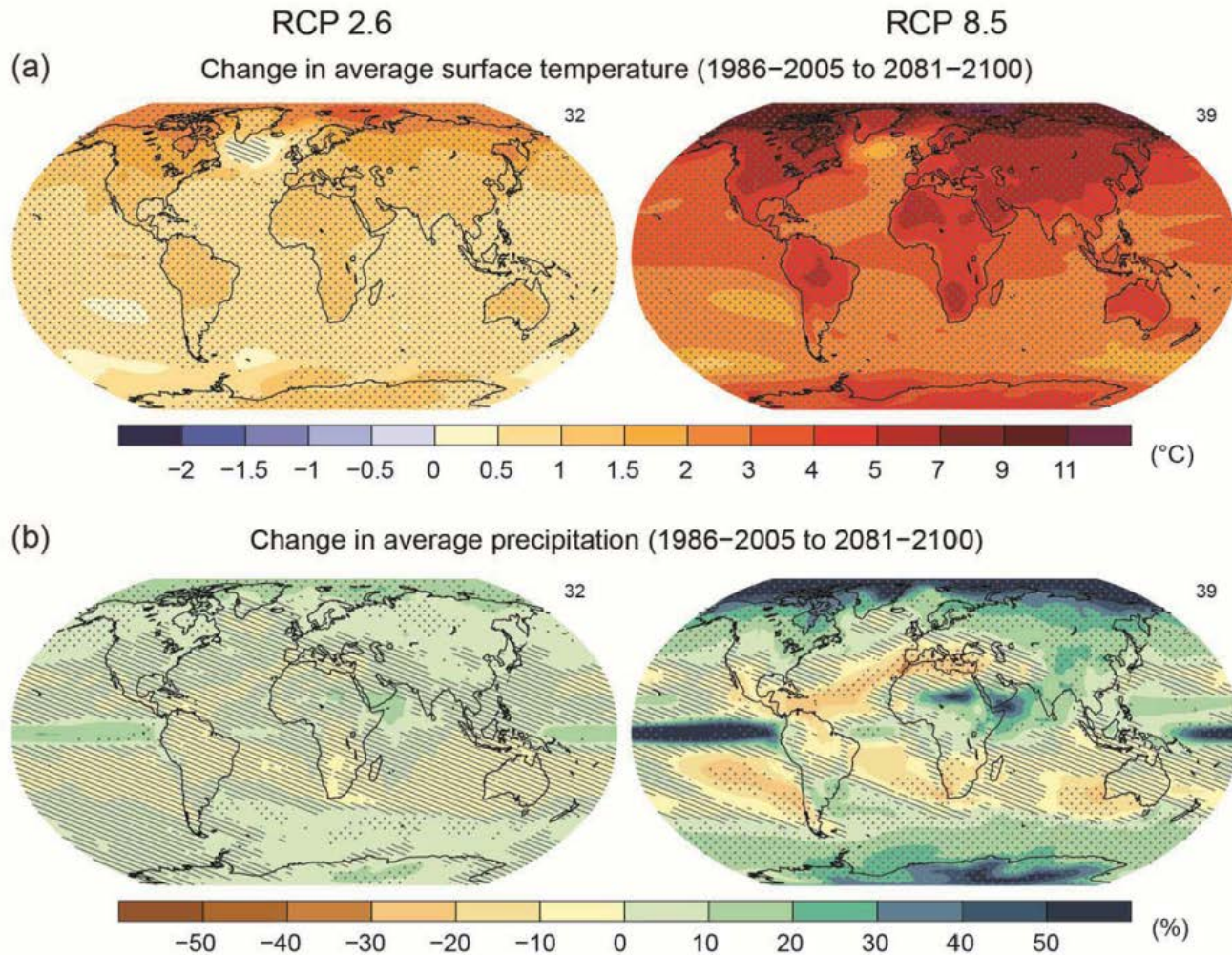
Concentration - CO₂-eq. (incl. all forcing agents)



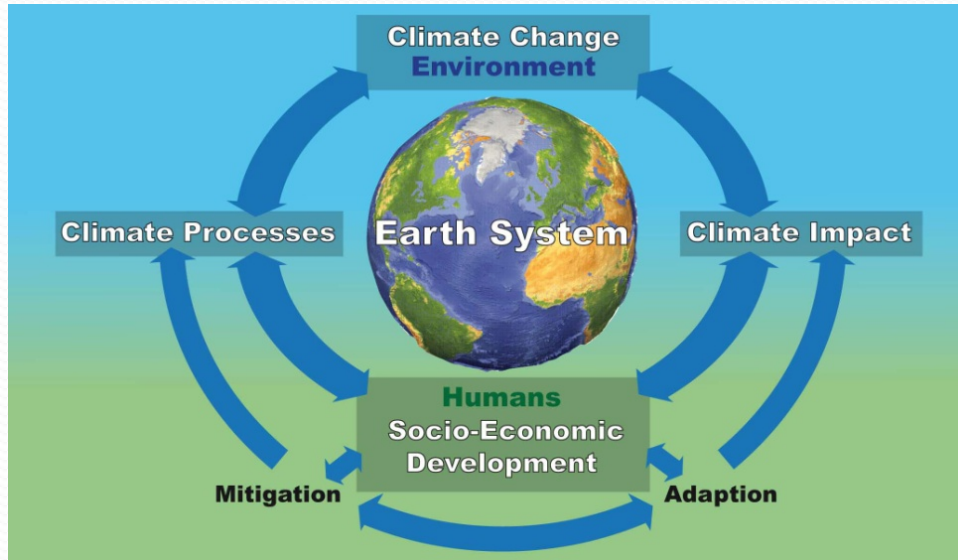
https://en.wikipedia.org/wiki/Representative_Concentration_Pathways



Climate Projections



Goal



- Analyze and evaluate the state of the Earth system
- Understand the interaction and feedbacks between system components
- Model subcomponents of this system



<https://www.uni-hohenheim.de/ecss>

1984

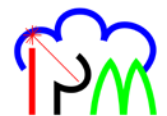


Chongqing, China

2016



<https://earthengine.google.com/timelapse/>

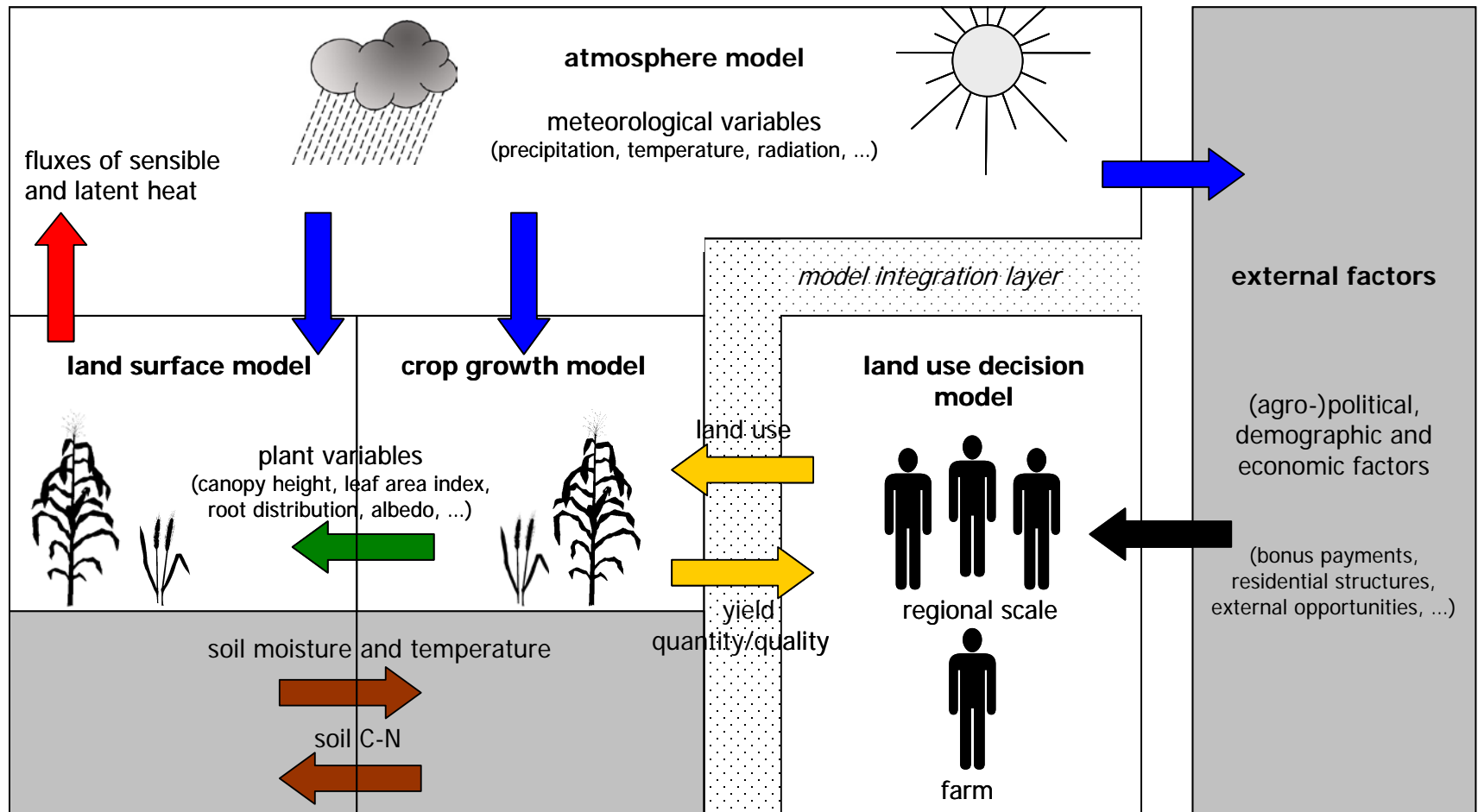


UNIVERSITÄT
HOHENHEIM

Research at the University of Hohenheim

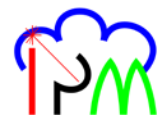
Integrated Land System Model: DFG FOR 1695

(see <https://klimawandel.uni-hohenheim.de/en/65926>)



Requirements

- Interest in natural sciences
- Interest in agriculture and economics
- Interdisciplinary thinking
- Transdisciplinary communication and collaboration
- Basic knowledge in physics and mathematics
- Basic knowledge in English (school English is fine)



Curriculum

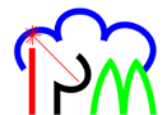
Strong thematic interaction between modules.

From Winter Semester 2018/19

	6 credits		12 credits		18 credits		24 credits		30 credits	
1 st sem.	Lecture Series Earth System Science (1201-550)	Mathematics and Computational Sciences of the Earth System (1201-610)	Sustainability (5206-270)		Weather and Climate Physics (1201-580)		Chemistry of the Earth System & Pollution (1301-460)		Ecosystems and Biodiversity (2101-500)	
2 nd sem.	Climate History and Evolution of the Earth System (1201-560)		Energy and Water Regime at the Land Surface (3103-500)		Debate Seminar (1201-570)	Measurement, Modeling and Data Assimilation (1201-520)		Elective Module		Elective Module
3 rd sem.	Elective Module		Elective Module		Elective Module		Elective Module		Elective Module	
4 th sem.	Master's Thesis Earth and Climate System Science (1200-500)									

Examples for offered elective modules:

- Special Topics of Earth System Science
- Remote Sensing of the Earth System
- Agricultural and Forest Meteorology
- Measurement, Modelling and Data Assimilation II
- Spatial Data Analysis with geographic information systems (GIS)
- Statistics for Natural Sciences
- Global Change Issues
- Ecotoxicology and Environmental Analytics
- Poverty and Development Strategies
- Astrobiology



Literature

- **Earth System Science, a Very Short Introduction, Tim Lenton, Oxford University Press**
- **Global Change and the Earth System, IGBP Series, Springer**

