Photo by Luca Galuzzi (www.galuzzi.it)

MSC 220: Climate and Global Change

SPRING Semester 2014
Tuesday and Thursday
Time: 11:00-12:15
Room: MM-204
Instructor: Prof. Igor Kamenkovich
(Email: ikamenkovich@rsmas.miami.edu)

Confused about the global warming debate? This course will help you to make sense of these discussions by covering the basics of science and policy of climate change. The climate of our planet is determined by interactions between the atmosphere, oceans, sea/land ice, solid Earth and biosphere. The course starts with the review of the most important processes involved in these interactions. Massive climate reorganizations of the distant past, like the transition of the Earth from a giant snowball to a hothouse, are discussed next in order to understand how the climate system works. Finally, the evidence for the ongoing climate change and its causes will be critically reviewed, and the most recent projections into the future and available policy solutions will be debated. Students from all levels are welcome.

OUTLINE:

Basics of climate

- Introduction (1 lecture)
- Atmosphere: composition, structure and circulation (2 lectures)
- Other components of the Earth System: ocean, ice, land (2 lectures)
- Water, carbon, aerosols and pollutants (2 lectures)
- How the system is powered: Radiation and energy balance (2 lectures)
- How climate can change: Climate sensitivity and feedbacks (1 lecture)

Climates of the past:

- How we learn of past climates: Paleoclimate data and models (1 lecture)
- Climate of the last billion years (1 lecture)
- Climate of the last million years: Ice Ages (2 lectures)
- Abrupt climate change (2 lectures)
- Climate of the last millennium (1 lecture)

Global warming: Present and future:

- Climate Impacts on Human Evolution and the Rise and Fall of Civilizations (Guest lecture) (1 lecture)
- Anthropogenic influence on the energy balance and carbon cycle (1 lecture)
- Observations of anthropogenic climate change (2 lectures)
- Climate modeling: Attribution and future projections (2 lectures)
- Climate impacts on South Florida (2 lectures)
- Policy solutions (2 lectures)