

Introduction to Earth Sciences
ESO 213A

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Department of Earth Sciences

Why study Earth Science?

- ❑ Understand, quantify, and predict occurrence of natural resources (precious metals, coal, petroleum, natural gas, ground water……)
 - ❑ Understand natural disaster (earthquake, tsunami, hurricane, volcanic eruption, flood……..)
 - ❑ Understand the environment, particularly climate change and its consequences
 - ❑ Investigate the strength of bedrock to support roads, dams, tunnels..

I like because I like to travel 😊



research stations

**India's Bharati Research Center
(the country's third Antarctic station)
is made from 136 prefab containers, but you
wouldn't know from looking.**

**The station's designed to
keep a minimal carbon footprint and
is wrapped in an aluminum case to protect against
wind and cold.**

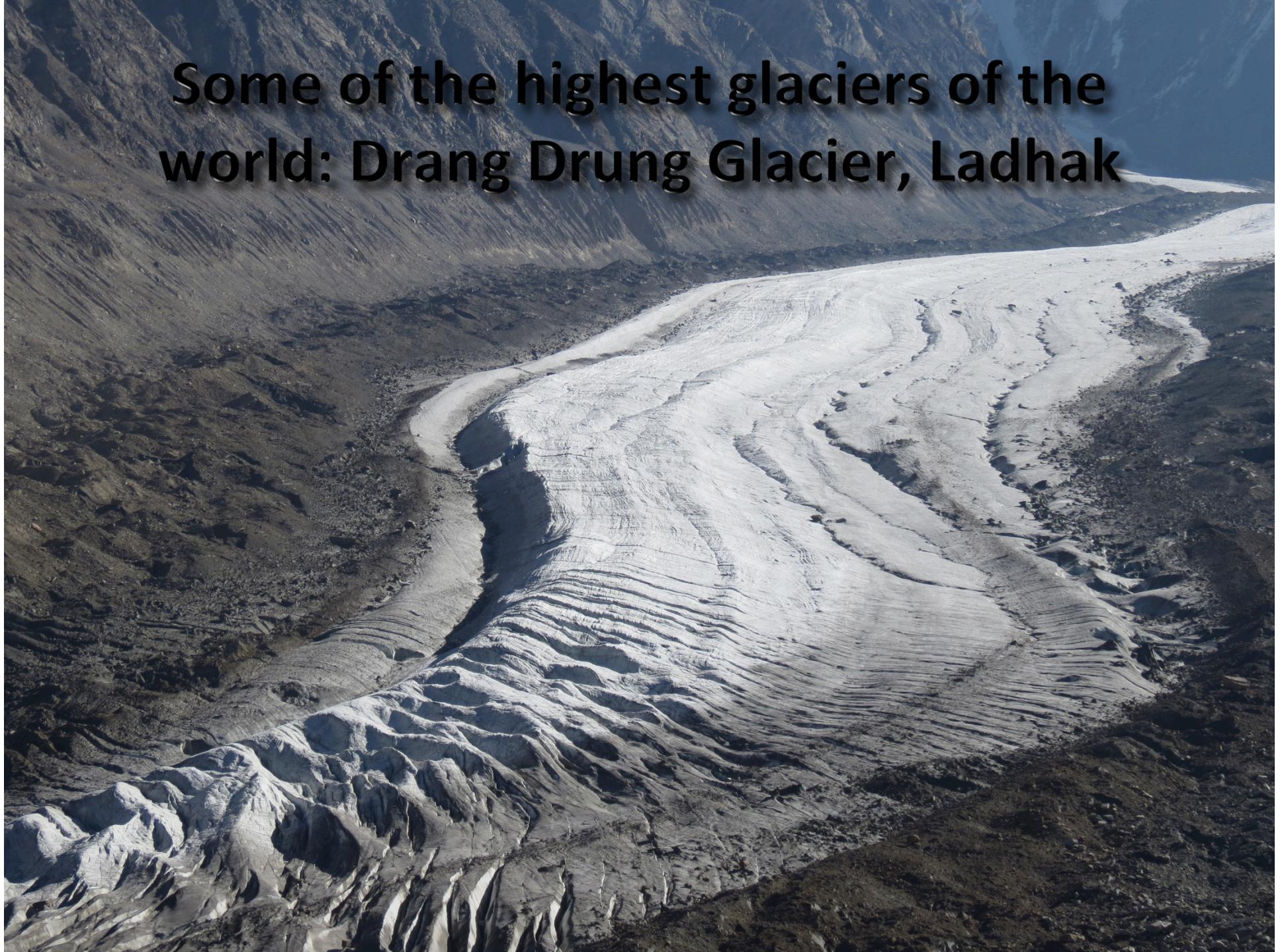




The Indian Astronomical Observatory (IAO), located near Leh in Ladakh, India, has one of the world's highest sites for optical, infrared and gamma-ray telescopes. It is operated by the Indian Institute of Astrophysics, Bangalore.



Some of the highest glaciers of the world: Drang Drung Glacier, Ladakh



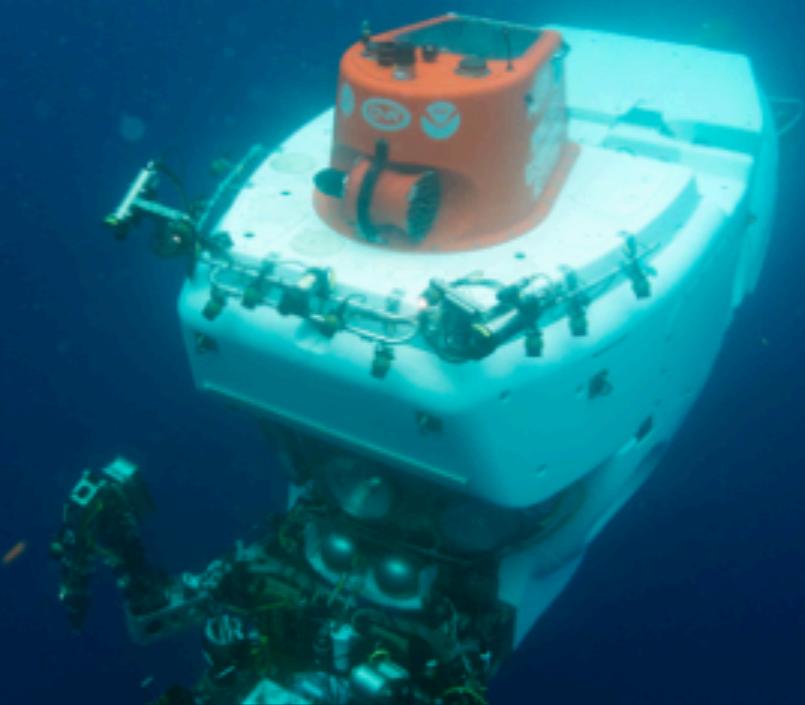
Patagonia Glacier, Argentina



Pacaya Active Volcano, Guatemala







Alvin during its 2014 science verification cruise in the Gulf of Mexico. The submersible has safely transported over 2,500 researchers on more than 4,800 dives to depths of 14,764 feet (4,500 meters). (Photo by Chris Linder, Woods Hole Oceanographic Institution)



Coral Reef





**North Pole to South Pole
High altitude mountains and glaciers to
ocean floor
active volcanoes to beautiful coral
reefs....**

**Instructor: Indra S. Sen (isen@iitk.ac.in);
office: Western Lab Extension-201)**

Lecture Schedule: MWF (10:00-11:00)

**TAs: Soumita Boral (soumita@iitk.ac.in);
Sohini Bhattacharya (sohini@iitk.ac.in);
Dipro Sarkar (dipro@iitk.ac.in); Smruti
Ranjan Patra (Smruti@iitk.ac.in); Ansari
Abdullah (ansariaa@iitk.ac.in)**

Date	Day	Topics (tentative)
31-Jul	Mon	Why would you study Earth Science?
02-Aug	Wed	Origin of Earth and its internal structure, and building block of our planets. Assignment 1: Watch the science fiction drama “The Core (2003)”
04-Aug	Fri	Plate tectonics
07-Aug	Mon	Divergent Boundaries
09-Aug	Wed	Convergent Boundaries
11-Aug	Fri	Magma and Igneous Rocks “Granites”
14-Aug	Mon	<i>To be announced</i>
16-Aug	Wed	Intrusive Activities and Volcanoes Assignment 2: Watch “Dante’s Peak (1997)”
18-Aug	Fri	Metamorphic rocks “Marbles”
21-Aug	Mon	Sedimentary rocks “Coal and Petroleum”
23-Aug	Wed	Quiz 1 , followed by Weathering and Soil
25-Aug	Fri	Earth’s history and Geological Time Scale Assignment 3: Watch “Jurassic Park (1993)”
28-Aug	Mon	Radioactive Dating
30-Aug	Wed	Radioactive Dating continued...
01-Sep	Fri	Crustal Deformation Earthquakes
04-Sep	Mon	Assignment 3: Watch “San Andreas (2015)”
06-Sep	Wed	Quiz 2 , followed by Hydrological Cycles
08-Sep	Fri	Rivers
11-Sep	Mon	Ocean (31 July-8 Sept mid semester syllabus)
13-Sep	Wed	Groundwater
15-Sep	Fri	Groundwater continued...
18-Sep	Mon	Mid Semester exam (Sept 18 to Sept 23) syllabus up to 11th September 2017

<i>25-Sep</i>	<i>Mon</i>	Mid Semester exam (Sept 24 to Oct 2)
<i>27-Sep</i>	<i>Wed</i>	
<i>29-Sep</i>	<i>Fri</i>	
<i>02-Oct</i>	<i>Mon</i>	
04-Oct	Wed	Glaciers
06-Oct	Fri	Climate Change
		Climate Change continued
09-Oct	Mon	Assignment 4: Watch “An Inconvinient Truth (2006)”
11-Oct	Wed	Earth’s Surface Processes
13-Oct	Fri	Deserts and winds
16-Oct	Mon	Natural Hazards
<i>18-Oct</i>	<i>Wed</i>	Diwali Break
<i>20-Oct</i>	<i>Fri</i>	Diwali Break
23-Oct	Mon	Quiz 3 (8 Sept to 13 Oct)
25-Oct	Wed	Atmosphere
<i>27-Oct</i>	<i>Fri</i>	Antaragini(Possibly holiday)
30-Oct	Mon	Earth Resources
01-Nov	Wed	Mineral Deposits and igneous processes
03-Nov	Fri	Conventional Hydrocarbon Resources
06-Nov	Mon	Conventional Hydrocarbon Resources continued
08-Nov	Wed	Quiz 4 (23 Oct to 6 Nov)
10-Nov	Fri	Unconventional Hydrocarbon Resources
13-Nov	Mon	Geology of other Planets
15-Nov	Wed	Revision

(1) Textbook and reading:

Please follow the power point presentations and lecture notes from class. Time to time, additional material in the form of chapter and papers will be given as reading material. You can also consult the following books:

1. E. J. Tarbuck, F. K. Lutgens and D. G. Tasa. Earth: An Introduction to Physical Geology, 2013 (11th Ed.). Prentice Hall. 912 p.
2. D. R. Prothero and R. H. Dott, Jr. Evolution of the Earth. 2010 (8th Ed.), McGraw Hill, 576 p.
3. J. Grotzinger and T. Jordan, Understanding Earth, 2010 (6th Ed.). Freeman, 710 p.

GRADING POLICY

I will follow the system of Relative Grading. Marks will be distributed as per the table -

<i>Quiz (open notes/books/internet ☺).</i>	<i>30 points</i>
<i>Mid Term</i>	<i>30 points</i>
<i>Final Term</i>	<i>40 points</i>

There will be 4 announced quizzes that make up 30% of your grade. Out of the 4 quizzes, the best 3 will be taken towards your grade. Don't miss your quizzes, as there will be no make up quizzes. Quizzes will be an open book; notes and you are free to use the Internet as well. Your mid-term and final term will cover 30% and 40% of your grade. Remember, both mid and final term will be closed book examination.

NO ATTENDENCE POLICY