Fundamentals of Earth Sciences (ESO213)

Earthrise first taken from Apollo 8 (1968)

Broad Topics that we will discuss

- Earth's place in space
- Earth's neighbours
- Origin and evolution of the Earth
- Key processes shaping the Earth
- Influence on the origin and evolution of life (in the past and today)
- Natural resources
- Climate change
- Human influence on nature and corrective measures

Ways you can learn & Earn Credits

- Quiz: 20% (Twice a month)
- Mid-Term Exam: 20%
- Initiative Exercise (IE): 20% (Monthly)

  1-page submission on one topic of student's interest based on topics discussed in the class.
- Q & A of the Week: 10% (3+7)

  Participation grade: 3% / Selection grade: 7%

  Top 10% of the questions or answers will get remaining 7% of the grade.
- Final Exam: 30%

Class Policies

- Assignments & Queries must be sent only to the course email (eso213a.iitk@gmail.com)
- Submission file name must be in the following format:

  <Year>_<Month>_<Date>_<Submission title>_<Student_Roll no>_<Student Name>

  e.g. 2023_08_01_IE-1_202101_PrthviKumar

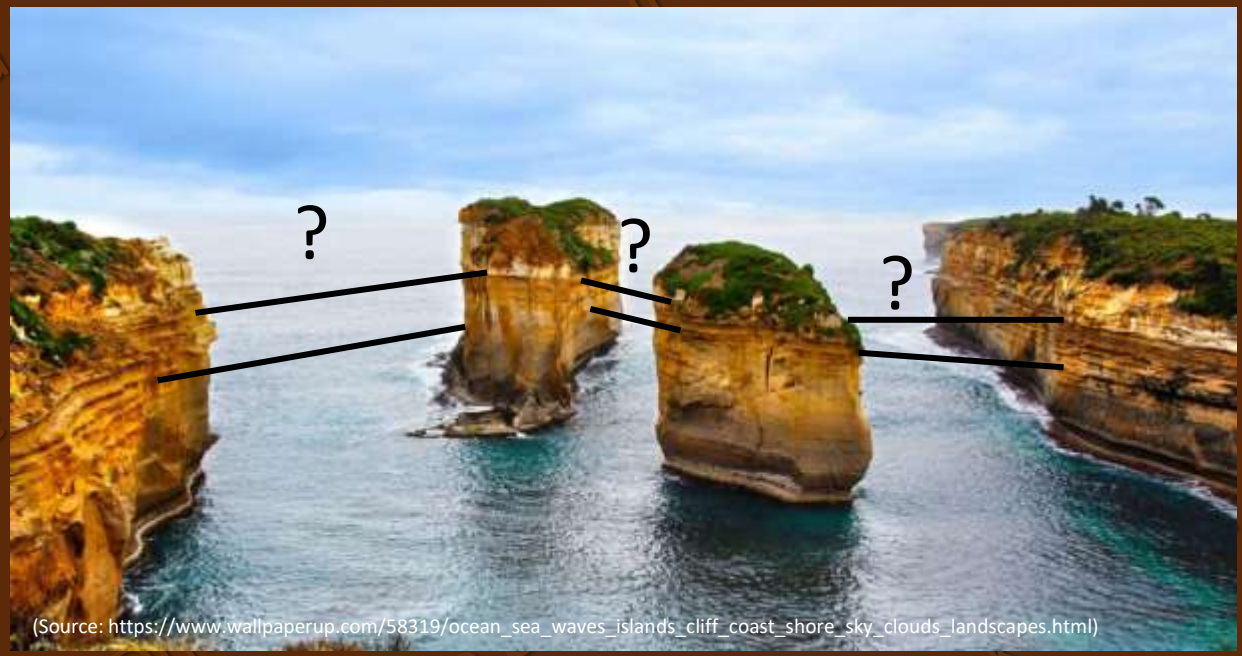
- Late submissions will **Not** be graded
- If evidence of copying of any kind (from another student or internet) is found, it will result in zero grade in that assignment/exam

Our Earth – A Great Place!

- Our Home
- Full of life & resources
- Spectacular landscapes
- What is Earth's future?
  Our future
- What was Earth's past?
- How did Earth originate?

The Earth

(Source: http://www.pbs.org/wgbh/nova/megaflood/quiz-01.html)



(Source: https://www.wallpaperup.com/58319/ocean_sea_waves_islands_cliff_coast_shore_sky_clouds_landscapes.html)

(Source: http://canyonministries.com.s3.amazonaws.com/wp-content/uploads/2015/12/Israel-Fold.jpg)

It's an Evolving Planet

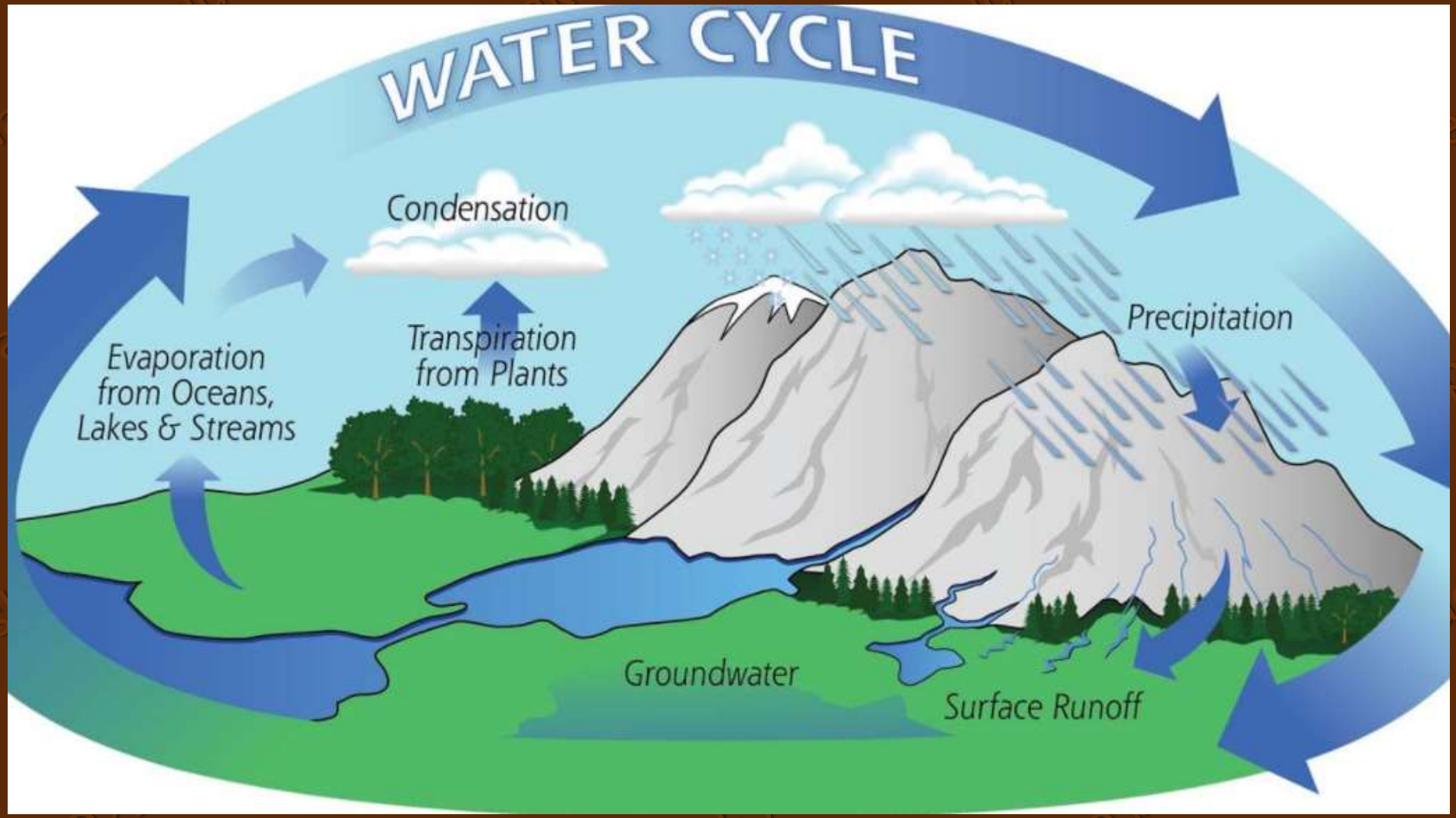
Earth: An Evolving Planet

illustration by Chris Neville

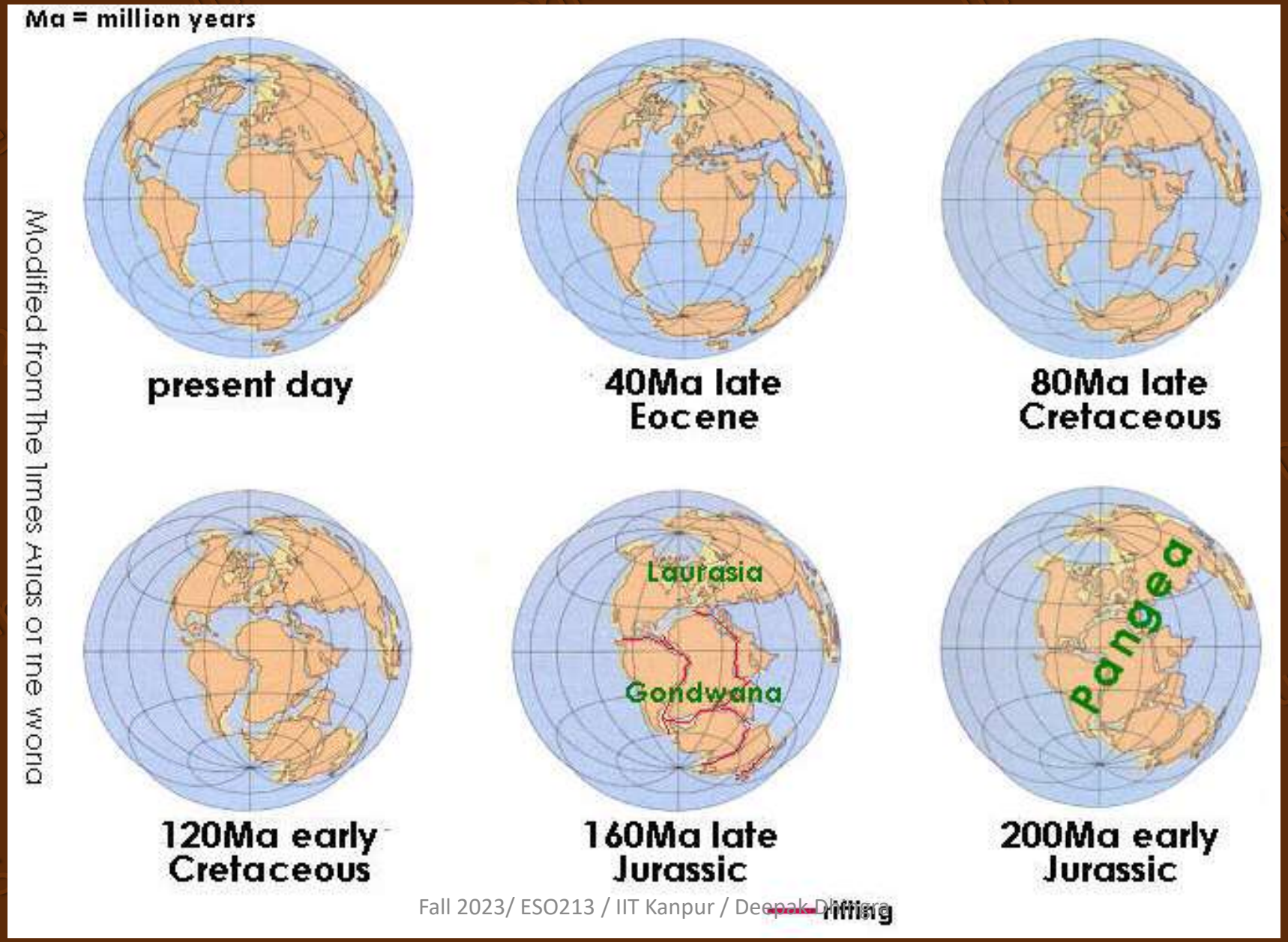
(Source: https://answersingenesis.org/geology/rock-layers/sifting-through-layers-meaning/)

- Things were happening on Earth, before us…
- What were those things?
- For how long things have been happening?
- How long will things continue to happen?
- Is it happening elsewhere, on other planetary bodies?

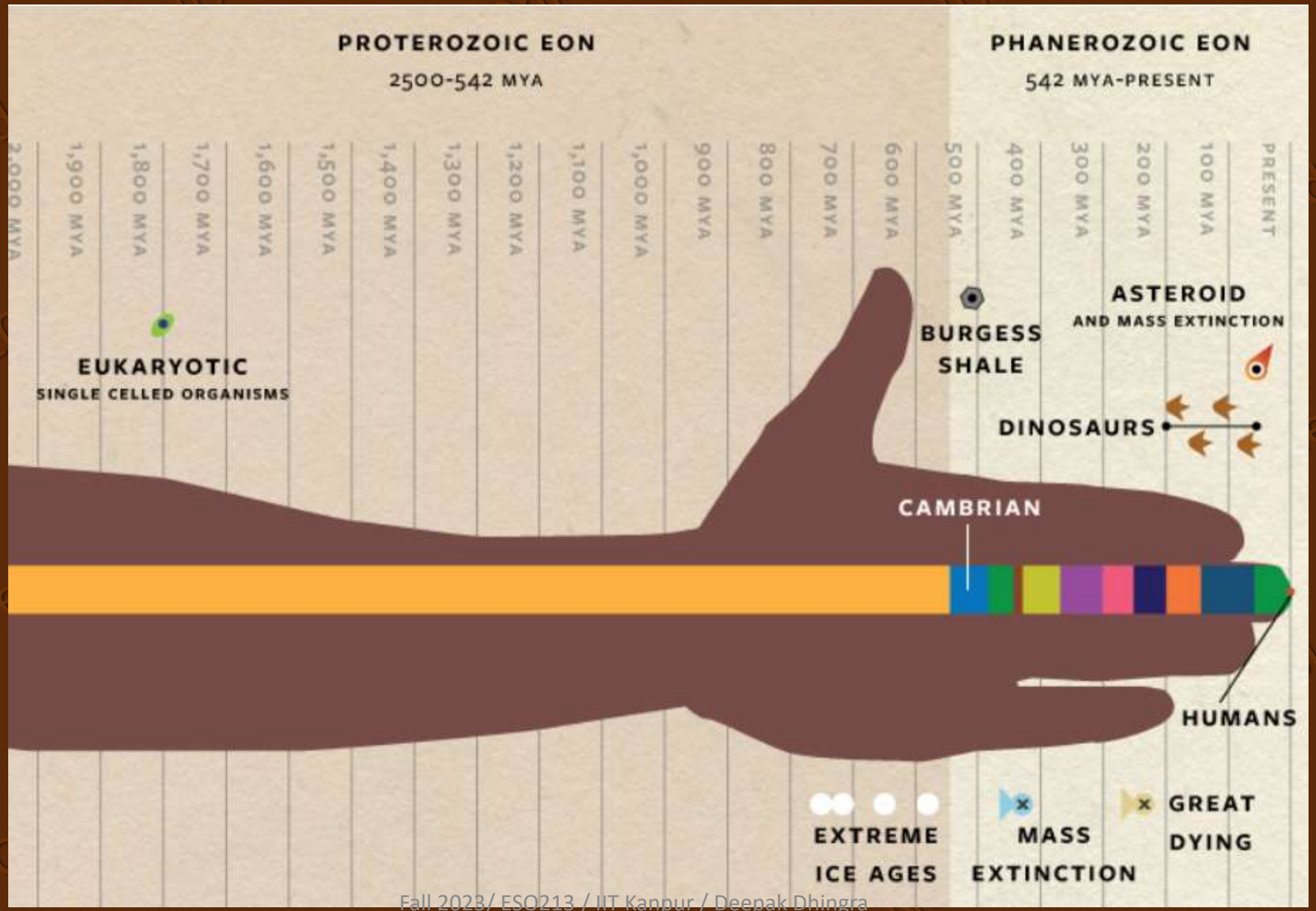
Earth: An Active Planet



Dynamic Earth



Looking Back in the Earth's Past



(Source: http://nautil.us/issue/17/big-bangs/the-greatest-animal-war)

Earth's History

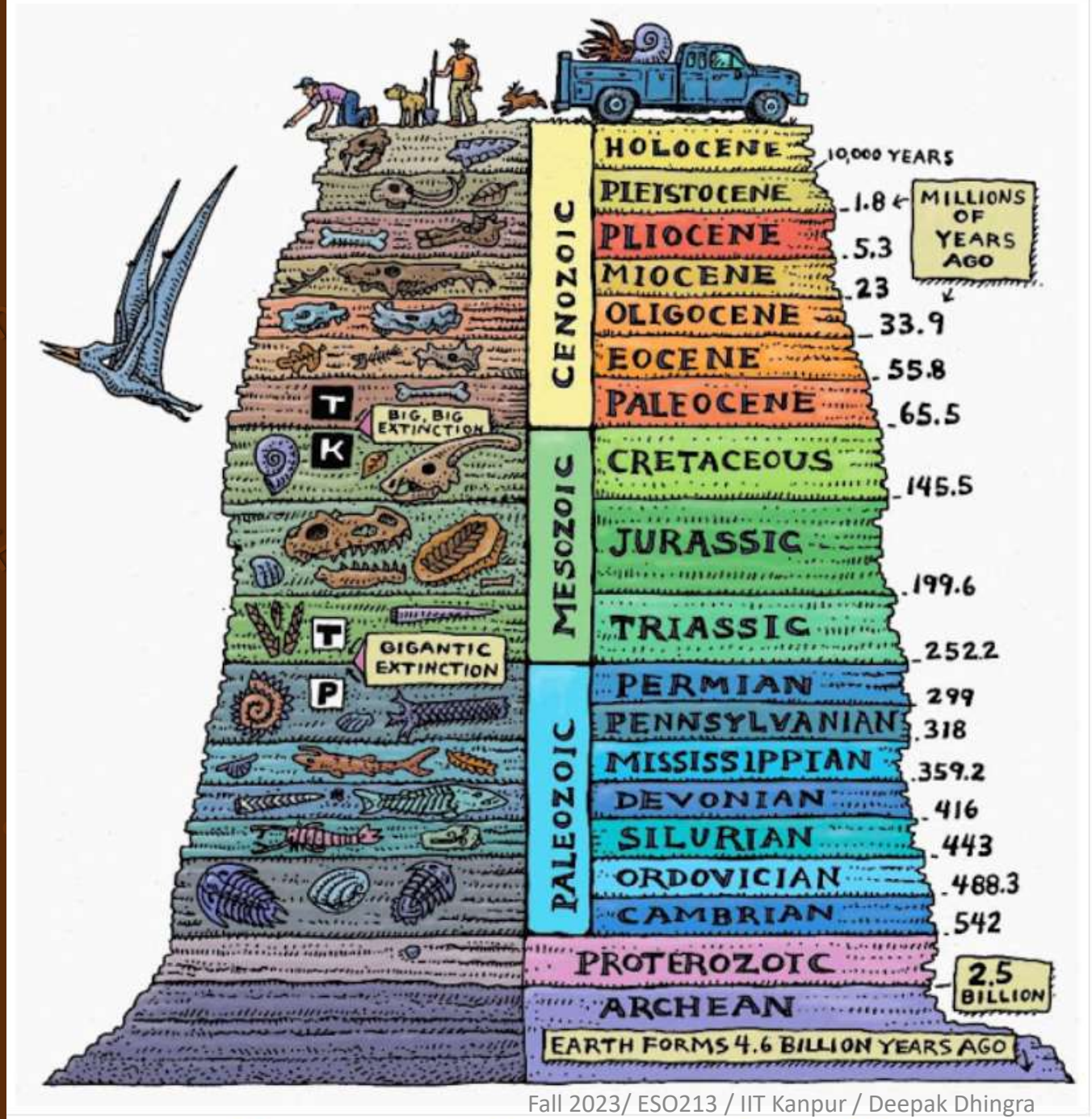


Image Credit: Ray Troll's creative approach on displaying geologic time is not only super cool, but inspiring.

Information availability drops as we go back in time

Exploring Clues to the Past

- Geological record is scattered throughout the solar system
- Records destroyed on the Earth could be preserved on other planetary bodies
- Some of the planetary bodies are pristine and are like *time capsules*, preserving information fron from the past
- Fundamental insights
  - *Origin of Water ?*
  - *Origin of Life ?*
  - *Early Earth ?*
  - *Early Sun ?*