Topic 06: They Cryosphere

Provide the definition of the cryosphere

How much faster has the Arctic warmed than the rest of the planet?

Why are is the cryosphere often referred to as the “Canary in the Coal Mine”? Explain

It makes intuitive sense that we have snowfall records going back a long time, but why have we also been keeping track of river ice and lake ice conditions, especially in the Arctic?

Explain permafrost and ground ice

Explain why the top of a glacier has crevasses and the deeper parts of the glacier do not

What are the four major ingredients required to make a mountain glacier? Explain

What are the two primary ways by which a glacier “moves downhill”?

Explain glacial retreat and advance in terms of the zones of accumulation and zones of ablation

How is the driving force behind a continental glacier slightly different from that of a mountain glacier?

How do ice shelves form? How do they grow in thickness?

Why does the Southern Hemisphere experience so little snow accumulation?

What is the decadal trend for snow cover in the Arctic since the late 1960s?

Other than “warming”, what else drives increased snow melting in the cryosphere?

What trends are visible in the ground ice versus floating ice data (lakes) from Northern Alaska?

Explain and distinguish between the three types of permafrost

What is an “active layer”, why and how does it form, and when?

How is active layer thickness tied to temperature?

Why does the loss of permafrost also exacerbate coastal erosion?

What is “nuanced” about the trend in Asian discontinuous permafrost freeze depths?

What impacts on humans, does the thawing of permafrost have?

Explain how cryovolcanoes form? Why do we think they are limited to only some parts of the Arctic?

Explain how sea ice forms, and how it changes throughout the year

What is the significance of the opening of the Northwest Passage in the early 2000s?

How does the break-up of ice shelves influence the glaciers that feed into them?

Why is measuring the length of a glacier or the position of its terminus not as precise a measure of how it is affected by warming? What is?

Why have some coastal mountain glaciers experienced times of growth (advance) in some recent years?

How can glacial melting actually leave to glacial advance?

Why are mountain glaciers important to humans?

Although striking, why are measures of surface meltwater extent across Greenland, not as affective a measure of how it is affected by climate change than,….what? Explain

How are seismologist tracking an increase in glacial ice mass loss among glaciers in Greenland?

What do the GRACE satellites do?

Why is Antarctica, not surprisingly, slower to react to global climatic changes?