Are rock glaciers a type of glacier? Is your glacier baby extra special?

We can agree to disagree.
But I say yes— they are a type of glacier (and yes, so special!).

Jeffrey S. Kargel, 5 May 2020

- Glacier: A perennial mass of snow or ice that flows under the force of gravity
- Twelve parameters or dimensions differentiate different types of glaciers
- All are continuous with other parameters
- There are near-endmembers and mixed types, but all are glaciers according to the definition above
- It doesn’t really matter: they exist, and if you disagree, well, your concept is continuous will all the other concepts of what here I consider to be glaciers
- Rock glaciers are a great case in point, where we can agree to disagree, but nonetheless there is this continuity as well as special endmember cases.

The following discrimination diagrams should be
used together (it is many-dimensional space).

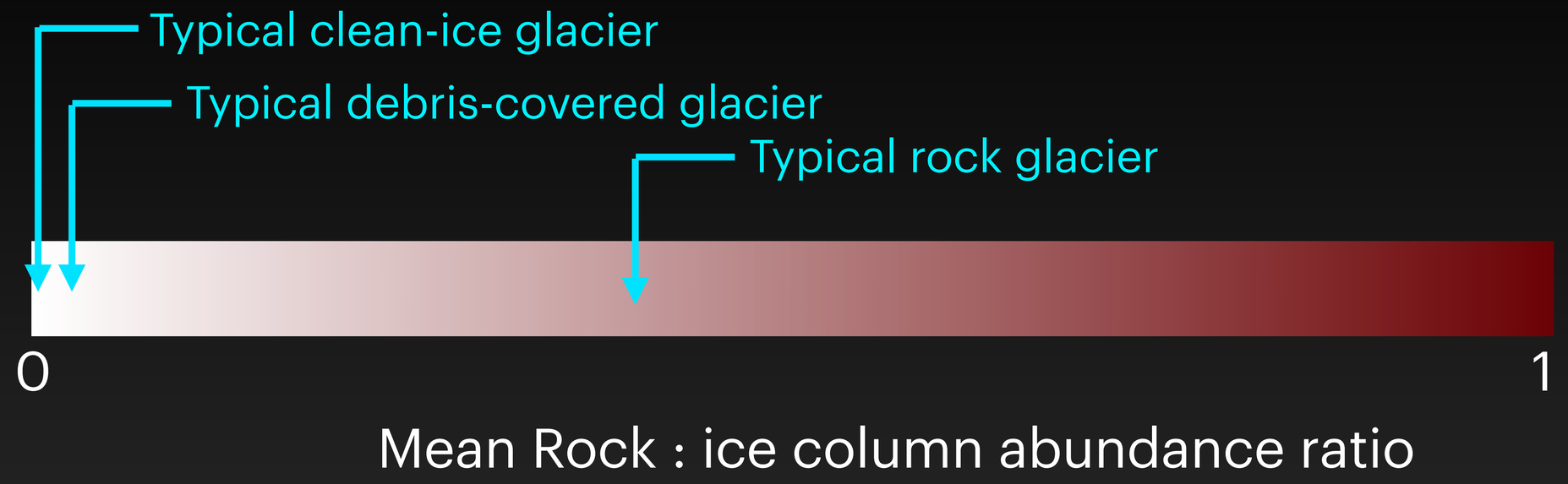
It is a schematic concept.
Don’t take the numbers too seriously.
Each glacier is a point or fills out a space in the diagrams.
Each region of similar glaciers fills out a bigger space.

Glaciers are of many types, and the whole
GLIMS/RGI database full of them would occupy all the space in the diagrams.

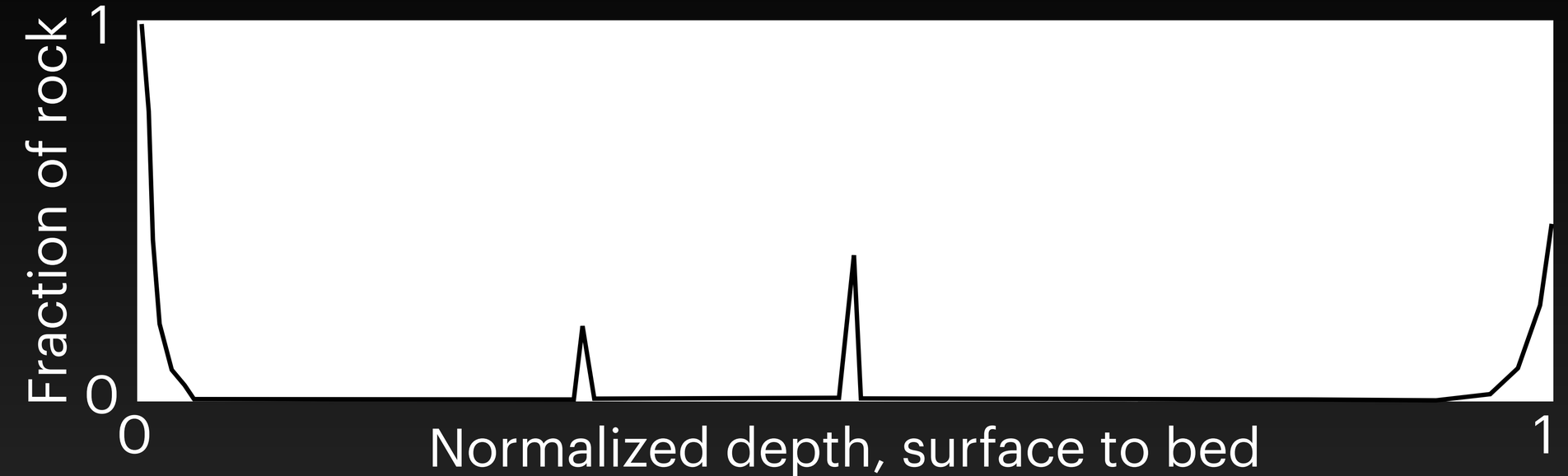
The diagrams explain why there is controversy about including rock glaciers with glaciers, or not. Rock glacier lovers feel their babies are special. And they are. Just like all the other babies. Each is special.
But they are just part of the continuum of glacier baby characteristics.

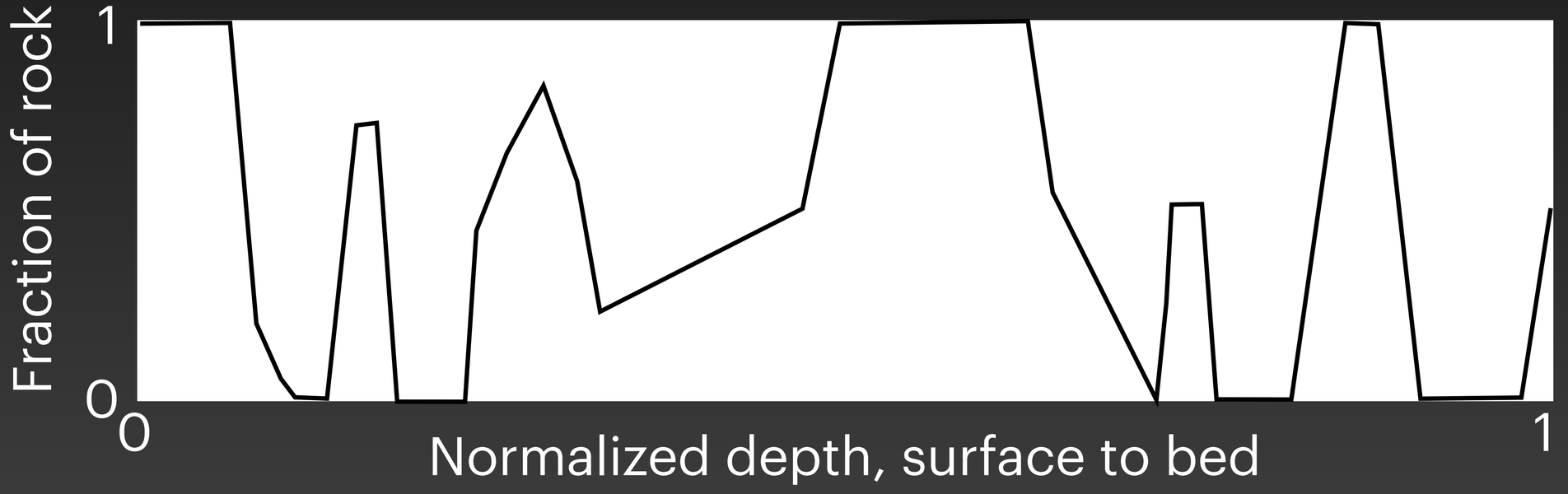
We should include them in GLIMS as I have said for 20 years.

Rock glaciers are special because they are very rocky



Rock glaciers are special because they have many alternating rock-rich and ice-rich layers or lenses all the way through





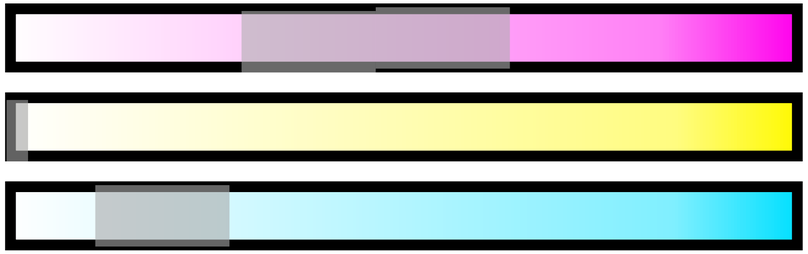
Discriminant category 1: amount and origin of the rock component

Supraglacial rock from mass wasting

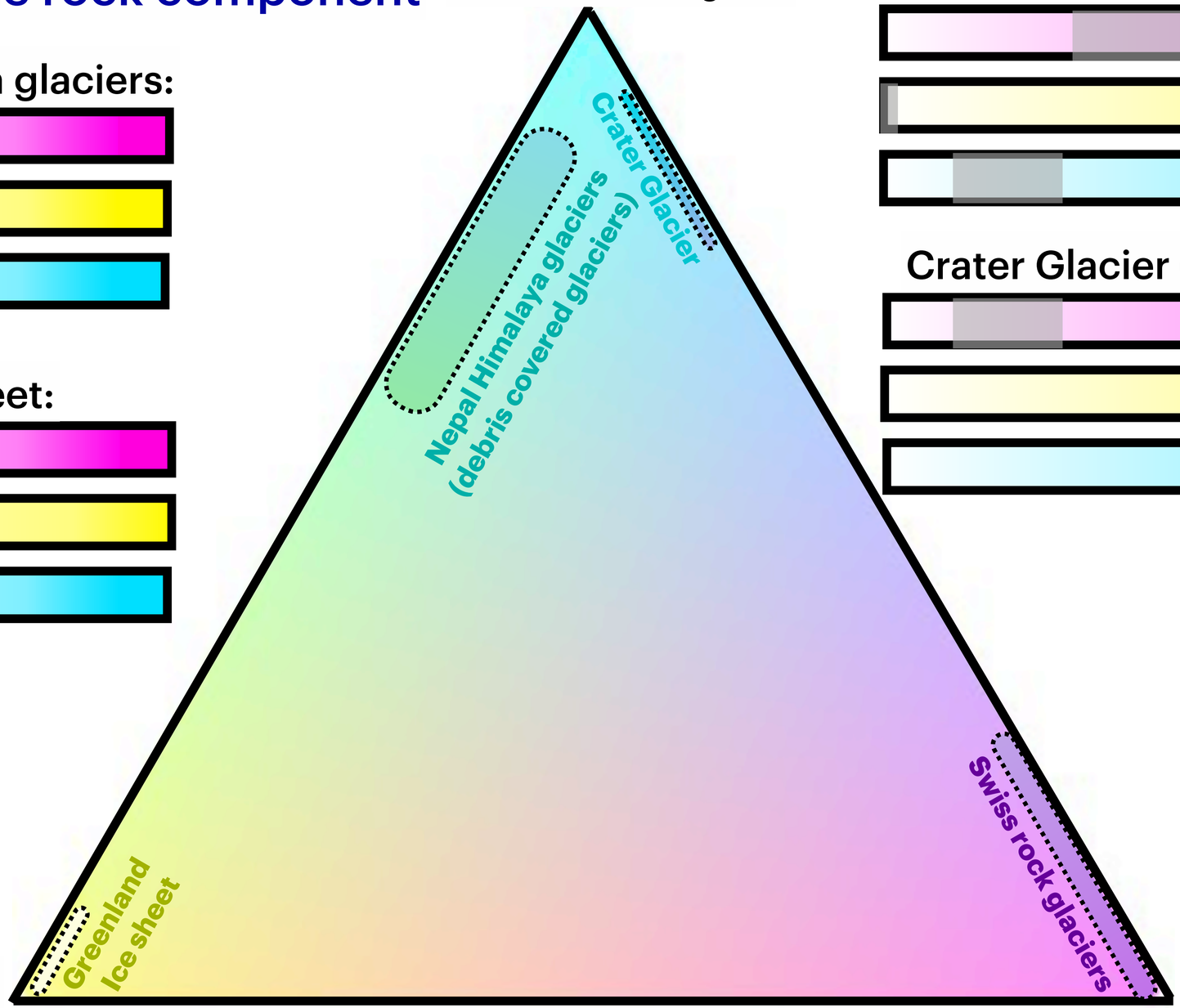
Typical Nepal Himalaya glaciers:

Greenland ice sheet:

Typical Swiss rock glaciers:



Crater Glacier (Mt St Helens):

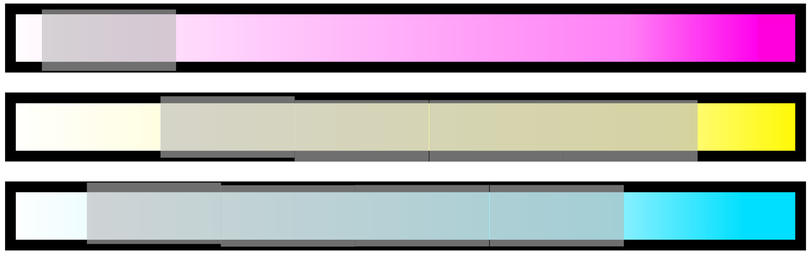


Rock from bed erosion

Reactivated rock from former talus or moraines

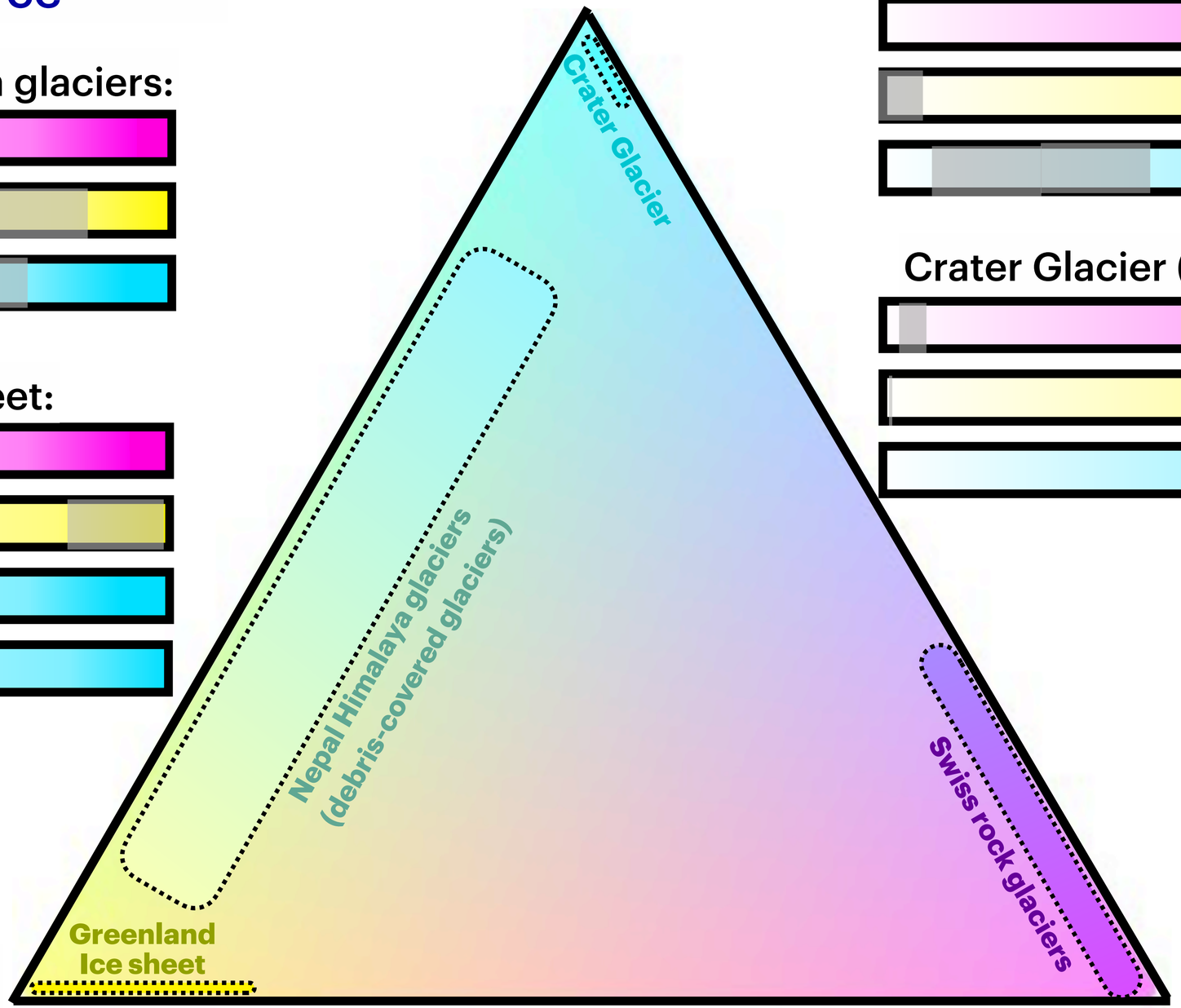
Discriminant category 2: Ice source

Typical Nepal Himalaya glaciers:

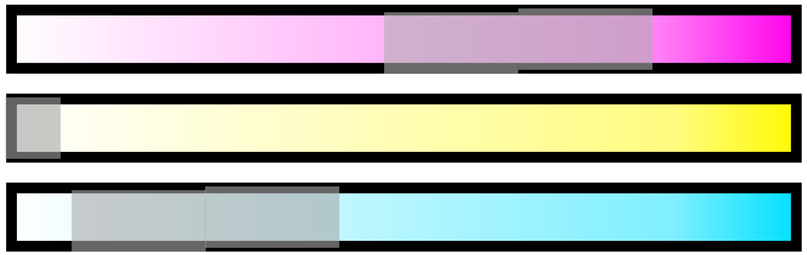


Greenland ice sheet:

Avalanche snow and ice



Typical Swiss rock glaciers:



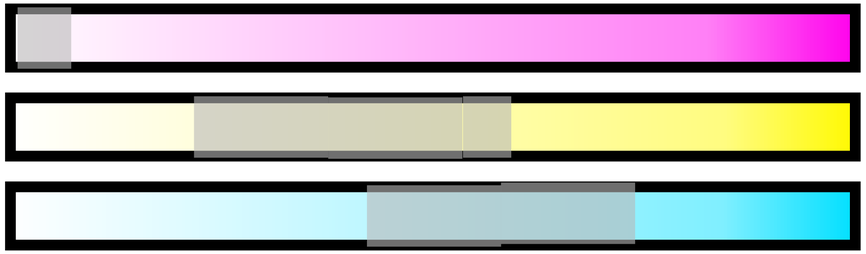
Crater Glacier (Mt St Helens):

Ice from direct snowfall

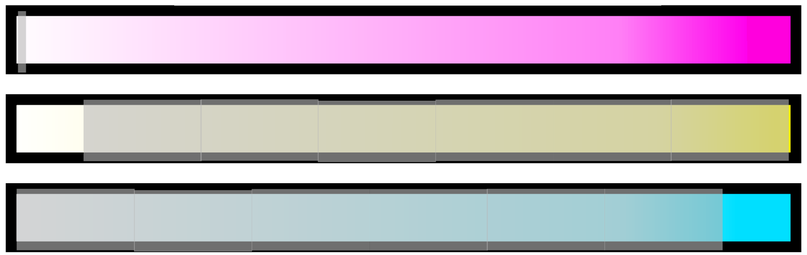
Refrozen superposed ice melt, and frozen rain

Discriminant category 3: Flow mechanism

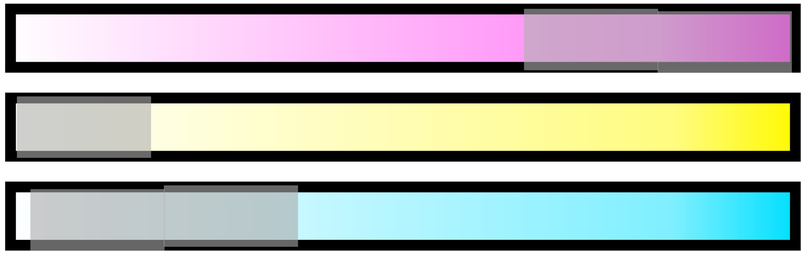
Typical Nepal Himalaya glaciers:



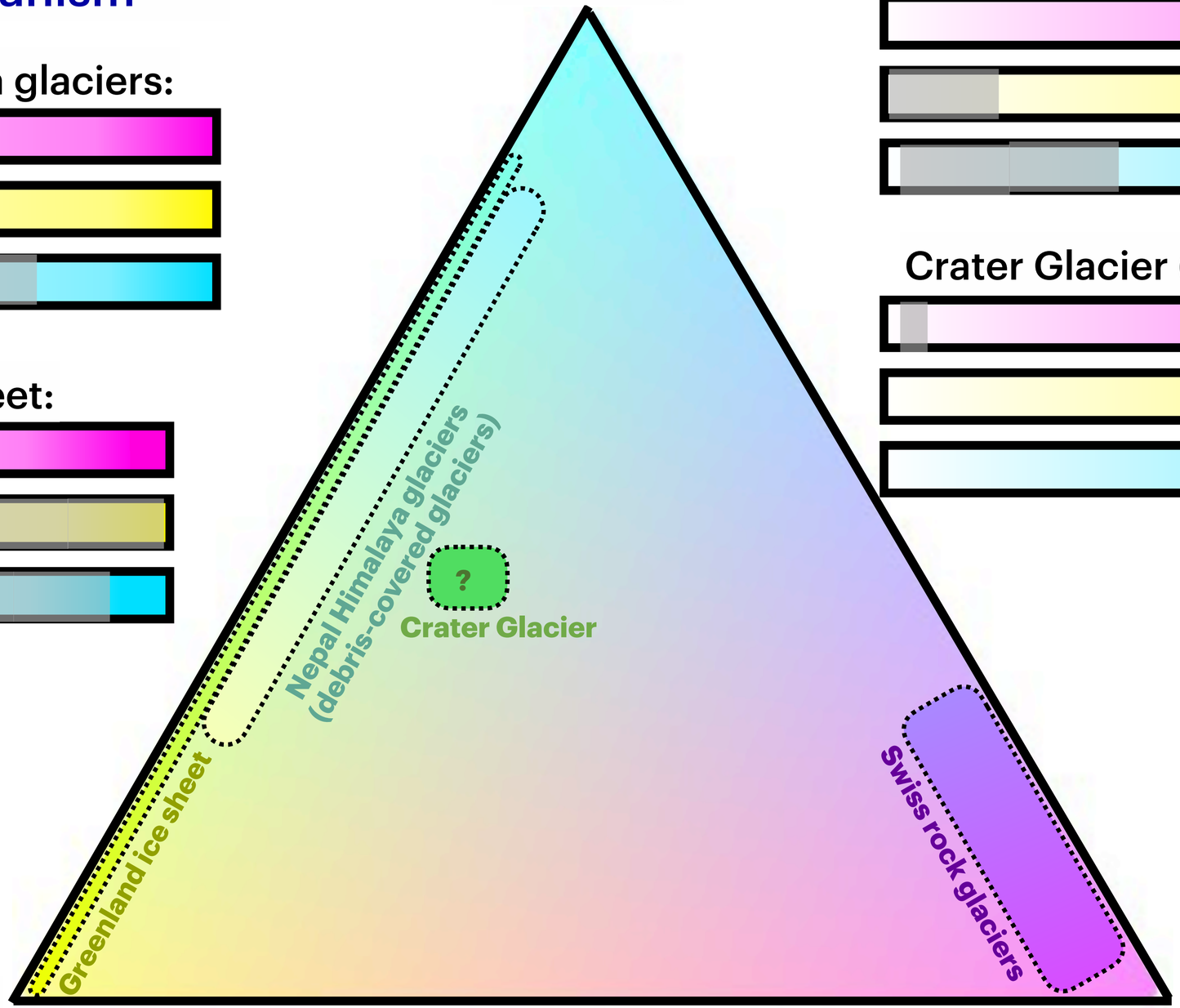
Greenland ice sheet:



Typical Swiss rock glaciers:

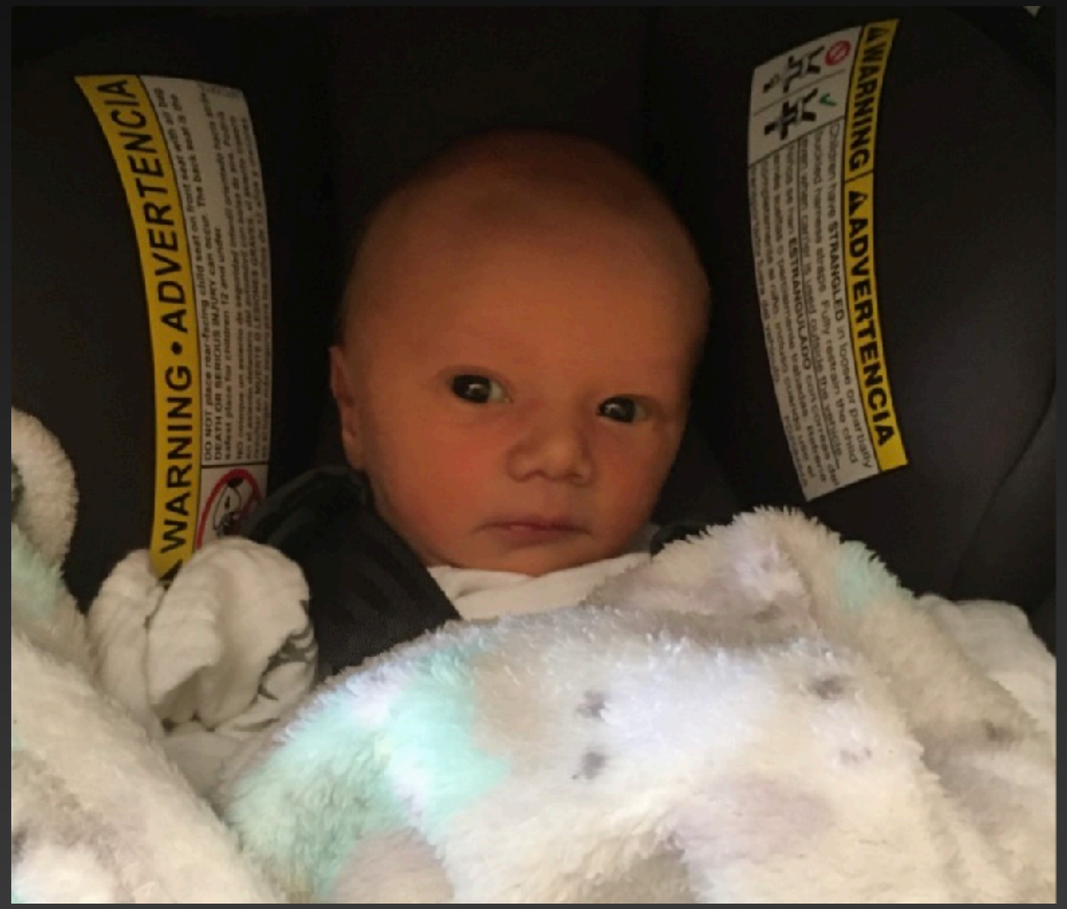


Crater Glacier (Mt St Helens):



- In addition, it may be meaningful to indicate whether the glacier likely accumulated from the start as a snowy mass, or whether it started as a pile of rocks (moraine or talus).

My new grandbaby is the most special grandbaby of all grandbabies, aside from my other grandbabies.



Meet Malachi, 4 days old in this photo.

I have not read the fine-print warning. Hopefully it does not say “Do not place most special babies here”

And my dog is extra special, too. (I won't say which one he is, but look for the specialest one, in this case not near an endmember— endmembers are not always most super-duper— and he's more perfectly uniformly colored than the other.) He may be a point on the continuum line, but don't dare say he's just a dog. He's the next stage in canine evolution! He's smartest, sweetest, most obedient and compassionate. He even saved a 7-year-old girl's life. (Seriously... oh, but people can go on too long about their grandpuppies.)
You will just have to wait a million years for your dog to be so special.

Meet Paxton (super-duper superdog) and Kona (really nice, too), cooperative stick fetching.

Is your rock glacier so special that it cannot hold the same stick

with the others?

If my super-duper superdog can share the stick,

then your rock glacier fits in the grand scheme with other glaciers.

- Glacier: A perennial mass of snow or ice that flows under the force of gravity
- Rock glaciers: A subtype of glacier, and part of the continuum of glaciers.