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Satellite-era glacier changes in High Asia

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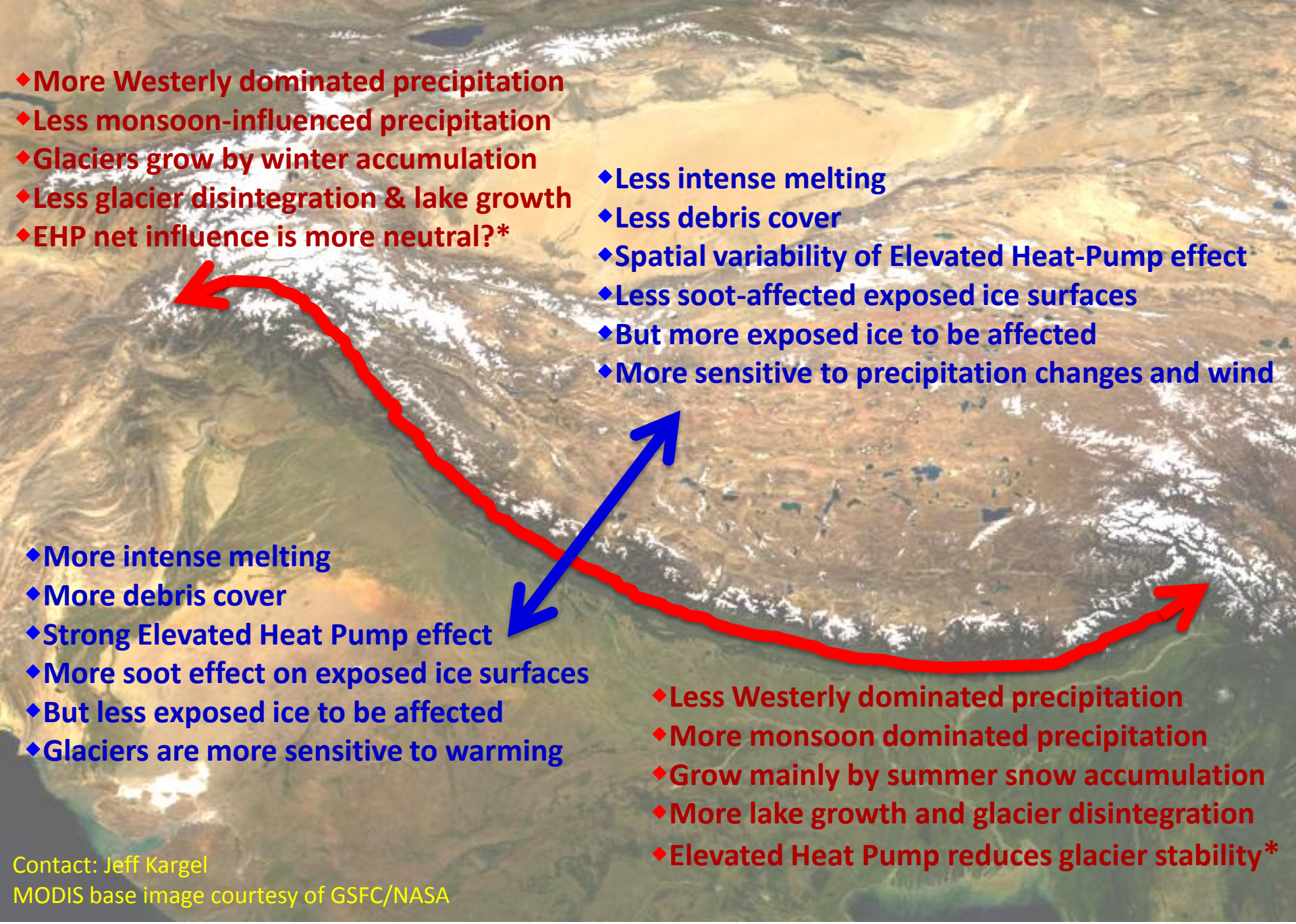
Presentation for "Black Carbon and Aerosols" press conference associated with Fall AGU, Dec. 14, 2009

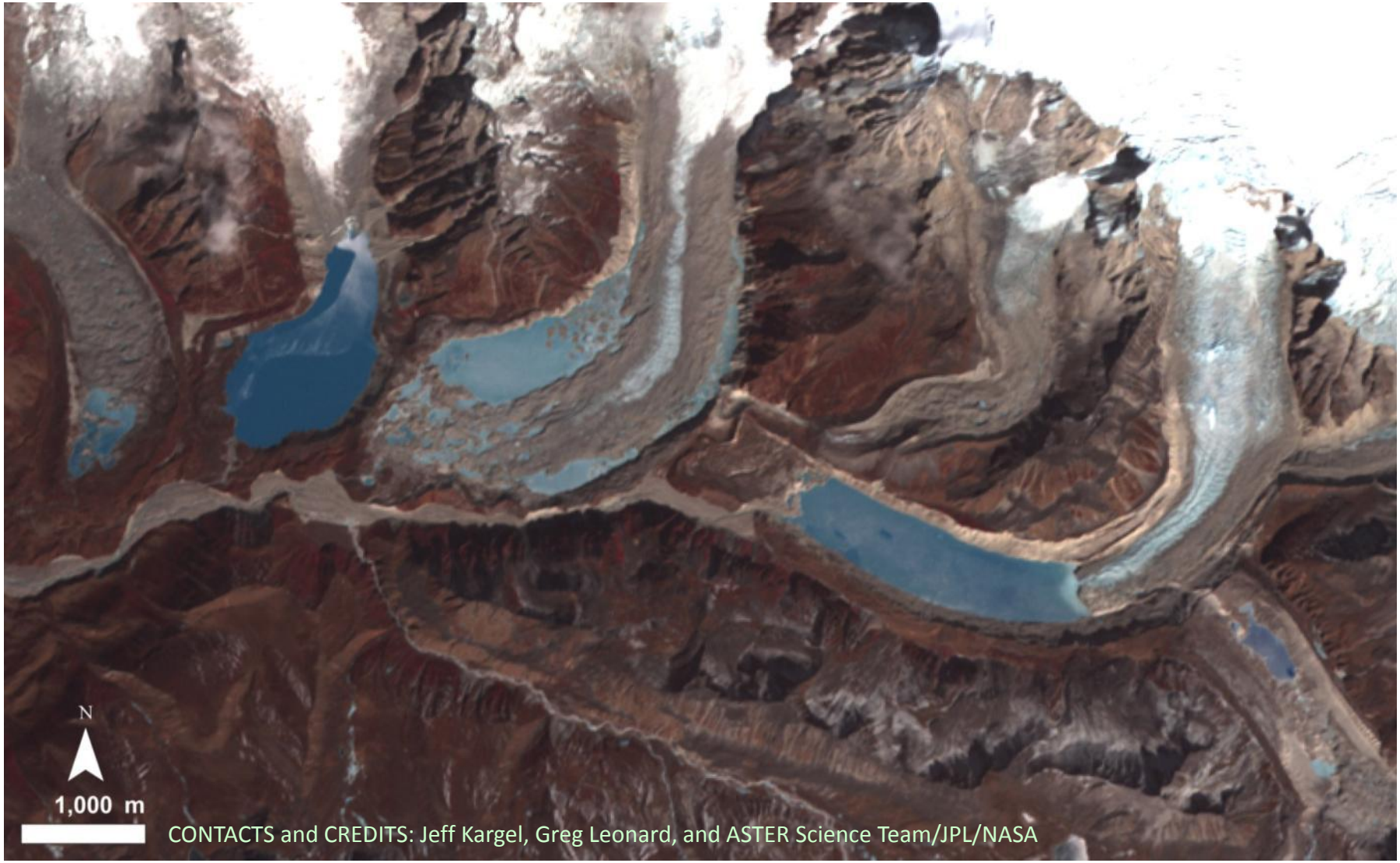
For a detailed background supporting presentation with many images and other information and fuller descriptions, please contact Jeff Kargel or Greg Leonard, or any coauthor

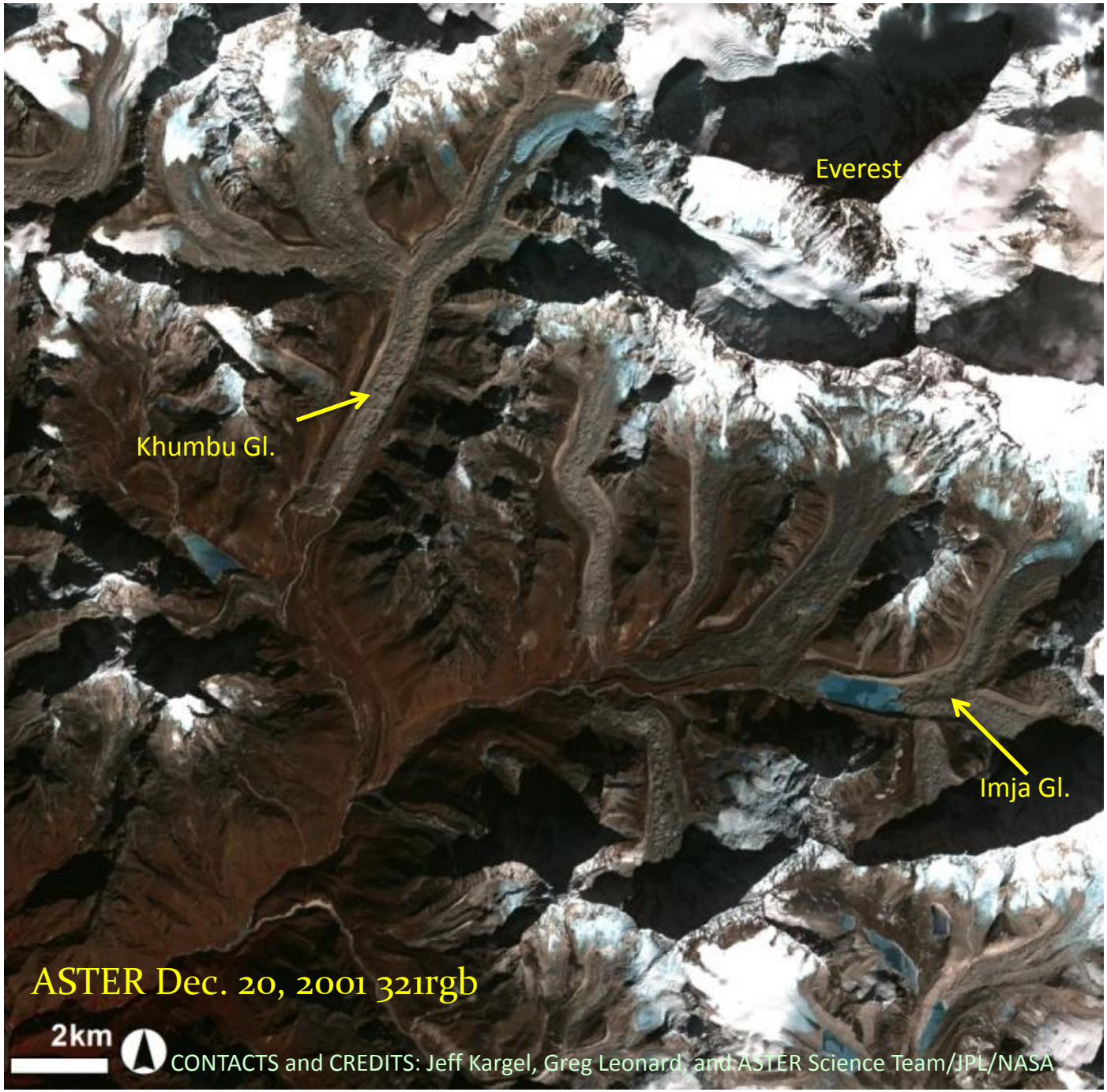


•Glacier behavior varies across the region, with faster retreat in the east. Possibly glaciers in northwest pick up more snow precipitation due to Elevated Heat Pump (EHP) and other climate mechanisms thus partly offsetting heating/melting. Glaciers in the eastern Himalaya may be more sensitive to EHP heating and are melting more quickly.

An example of what has been happening, starting mainly in the 1960's, in the eastern Himalaya: Debris-covered glacier tongues are rapidly wasting and are being replaced by growing lakes.

North Bhutan – ASTER Imagery (321rgb) **30 Jan 2007**





Typical in-place wasting (thinning) of glaciers near Mt. Everest.

These are examples of stable glacier termini with stagnating debris-covered tongues. In this area, glaciers are known to be down-wasting (thinning) and slowly losing mass along their debris-covered tongues. A well-studied example is Khumbu Glacier (stagnant, thinning terminus).

Imja Glacier represents a case of rapid retreat like that occurring in Bhutan and may indicate that this process Is spreading westward.

Conclusions

- Global climate change is a huge factor in this region.
- There are W→E and N→S transitions to wetter and warmer climate, and this shows in the pattern and complexity of glacier changes being observed.
- Soot deposition and aerosols are pretty clearly an important part of the climate system, especially in recent decades.
- The effects on glaciers of industrial and natural particulates as well as global warming vary across the region.