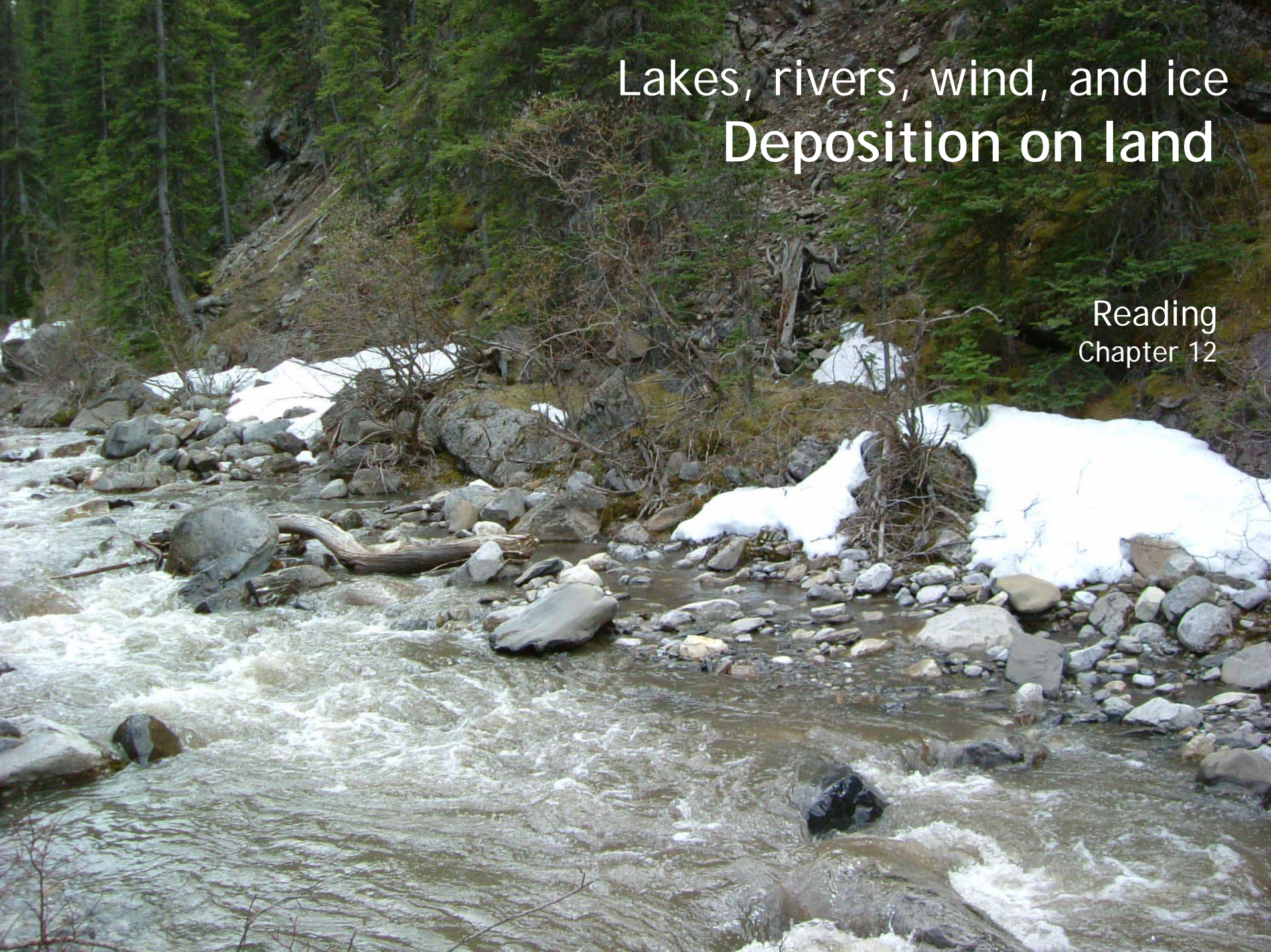


Lakes, rivers, wind, and ice Deposition on land

Reading
Chapter 12



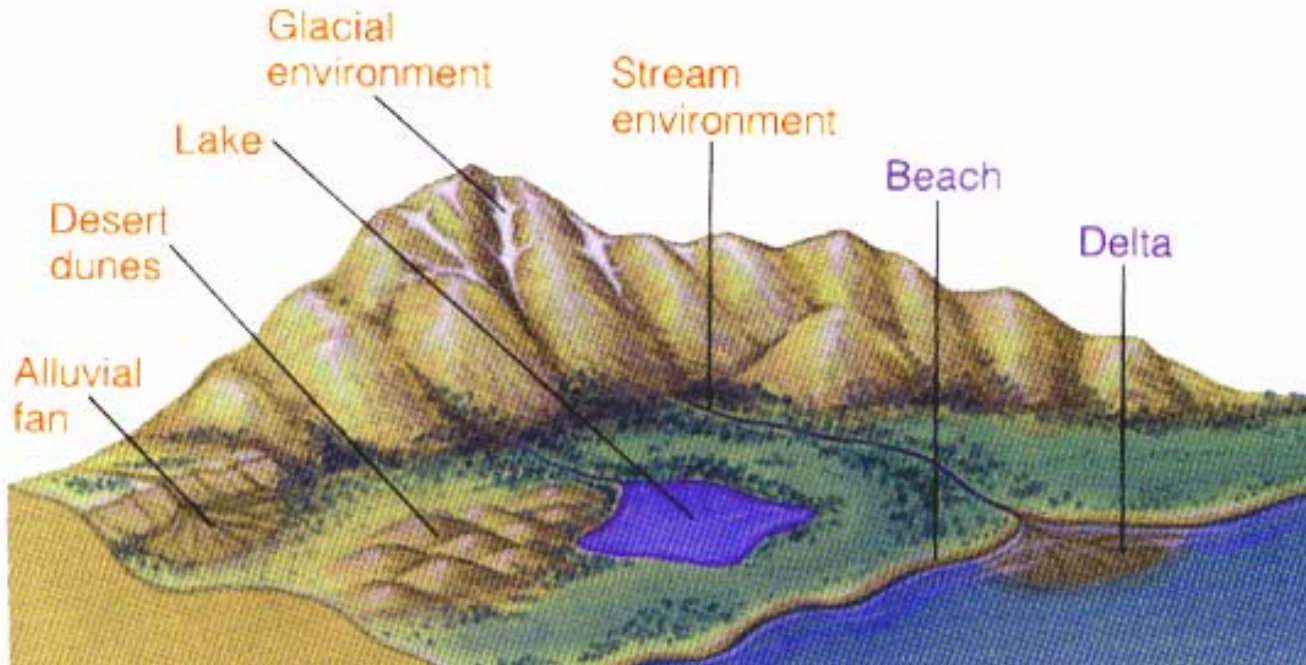
Terrestrial Depositional Environments

Fluvial - streams and rivers

Lacustrine - lakes

Aolian - windblown deposits

Glacial - ice-carried deposits



General terminology

Fluid - a substance that has no resistance to a shear force.
Includes water and air. Fluids carry sediment loads.

Flow - movement of a fluid.

Laminar flow - smooth flowing fluid, like water in pipes.

Turbulent flow - fluid flow that is more sinuous or chaotic.

Viscosity - the internal resistance to flow.

Density - mass relative to volume.

Load - the sediment particles being carried by a flowing fluid.

Settling - the dropping of sediment load from a flowing fluid. Sedimentation.

General principles

- Fast, turbulent flow can carry a greater sediment load, and larger grains, than slower laminar flow.
- Grains of different size and shape settle at different rates of flow.
- Small grains are picked up at a lower velocity and remain suspended longer than larger grains.
- Large grains settle quickly, immediately if they are large enough.
- **Therefore:** fluid-carried sedimentary deposits tend to be 'well sorted', which means that they have grains of a typical size.

Fast, turbulent flow carries larger particles, which predominate in the middle of the stream (sands, gravels, cobbles)

The largest rocks and boulders are moved only during when flow is at exceptionally high velocity, such as floods, so they are found along the banks

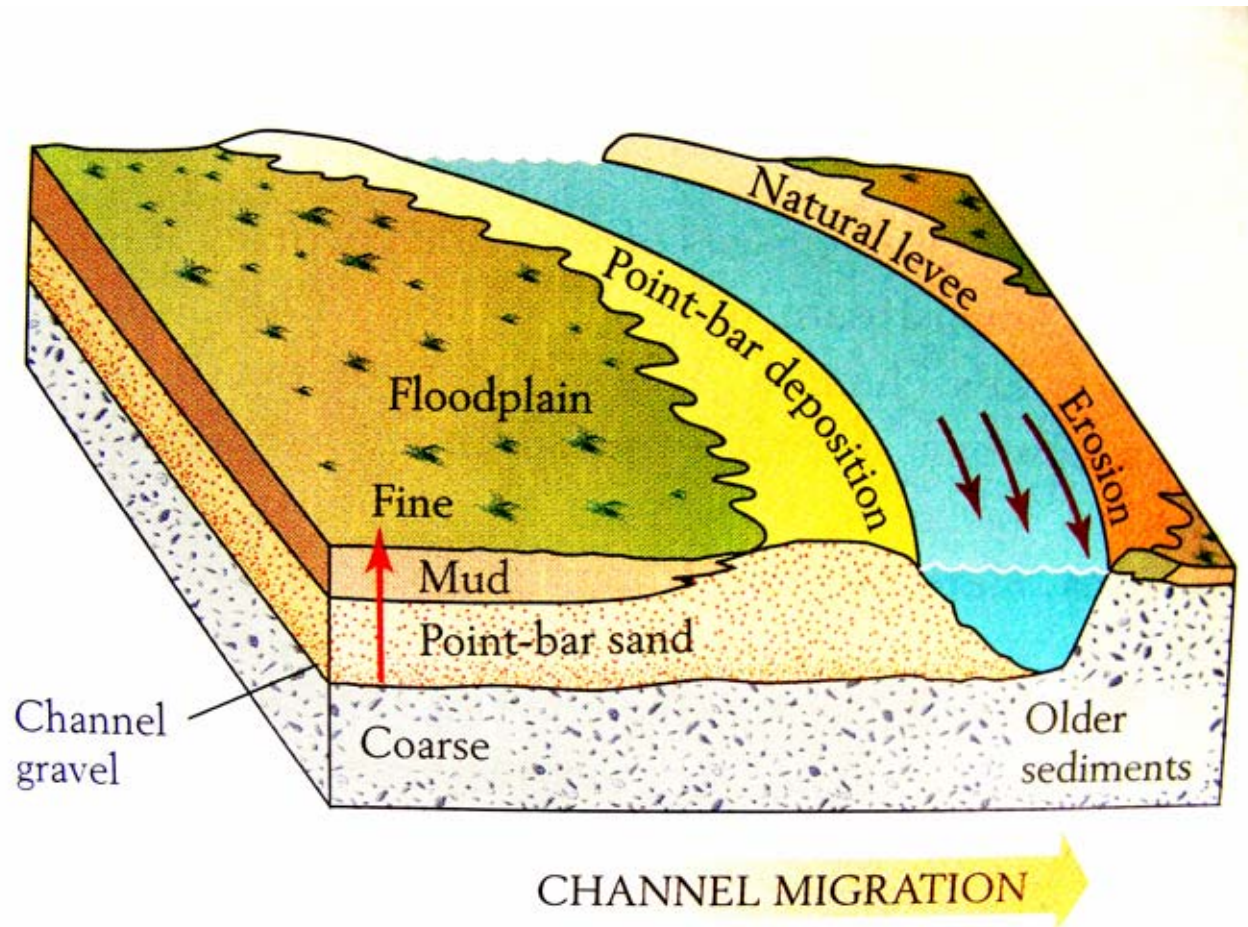
Slow, laminar flow carries only small particles, which predominate along the edges (muds, silts)



Fluvial systems - Rivers and streams

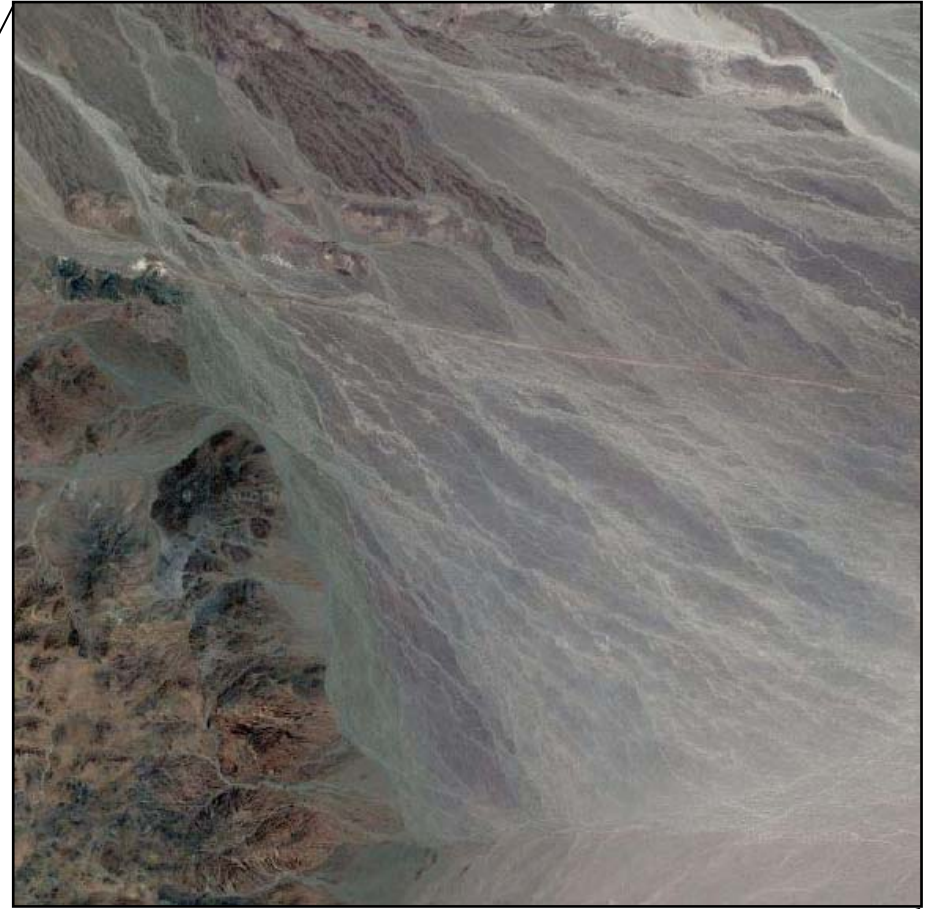
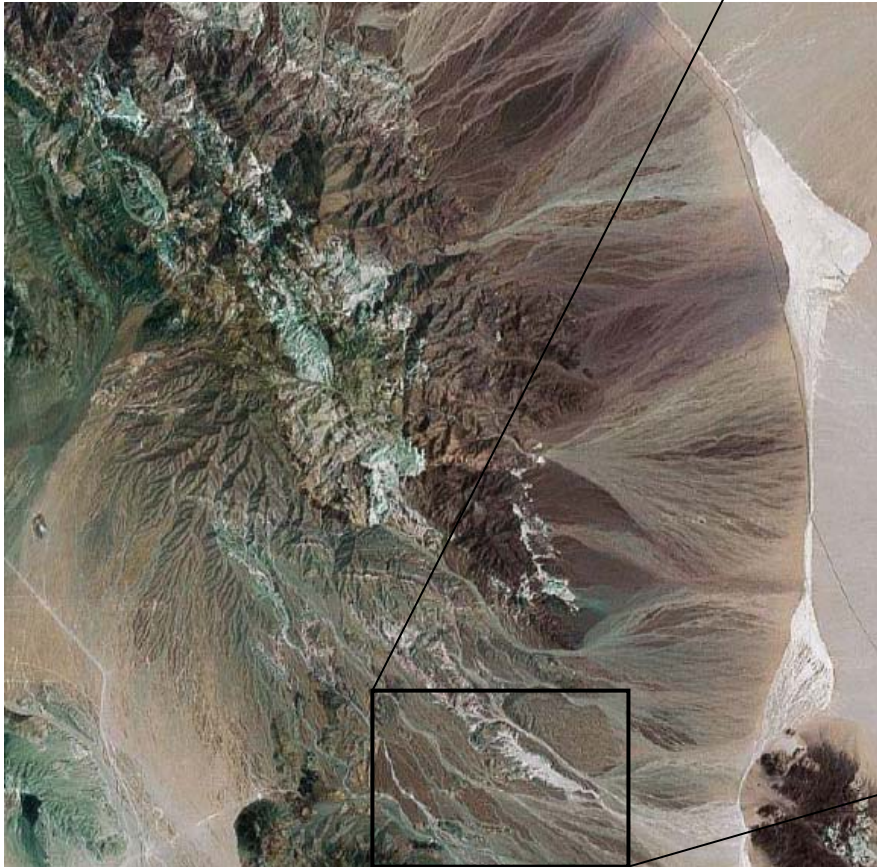
Deposits often 'fine upwards' or go from coarse to fine grained from the bottom of the deposit to the top.

Fossils often collect in point bars and channels because they are large 'grains'.



Alluvial fans

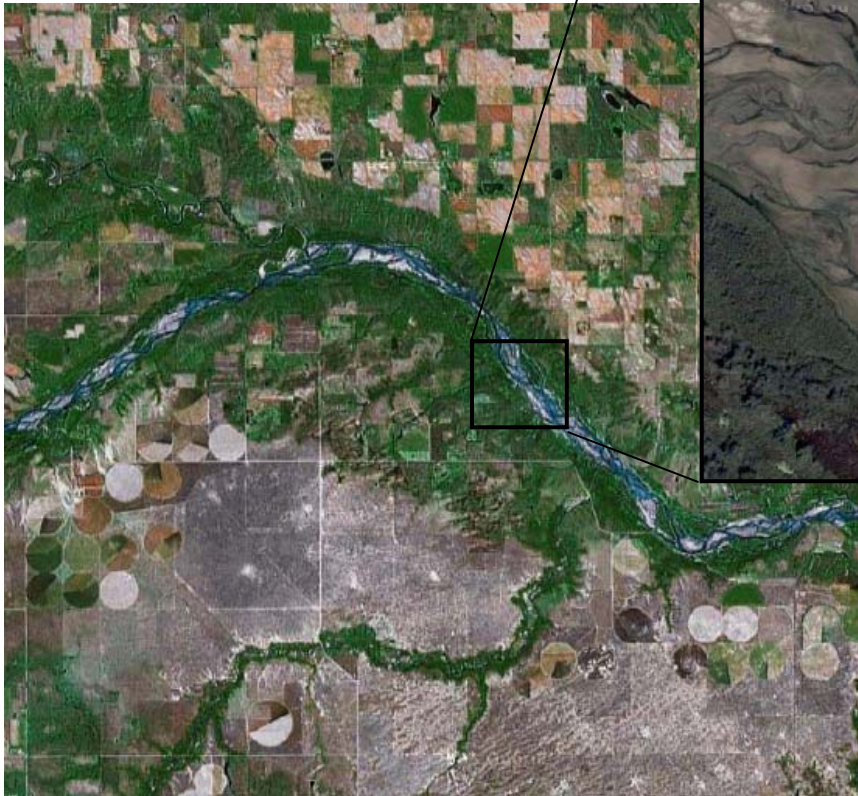
Deposits at the foot of mountains and hills, especially in arid regions



Missouri River
Barstow, California
maps.google.com

Braided stream

Form where with high volumes of coarse sediment relative to flow
- high elevations, areas with low vegetation, areas with low rainfall



Platte River
Butte, Nebraska
maps.google.com

Meandering stream

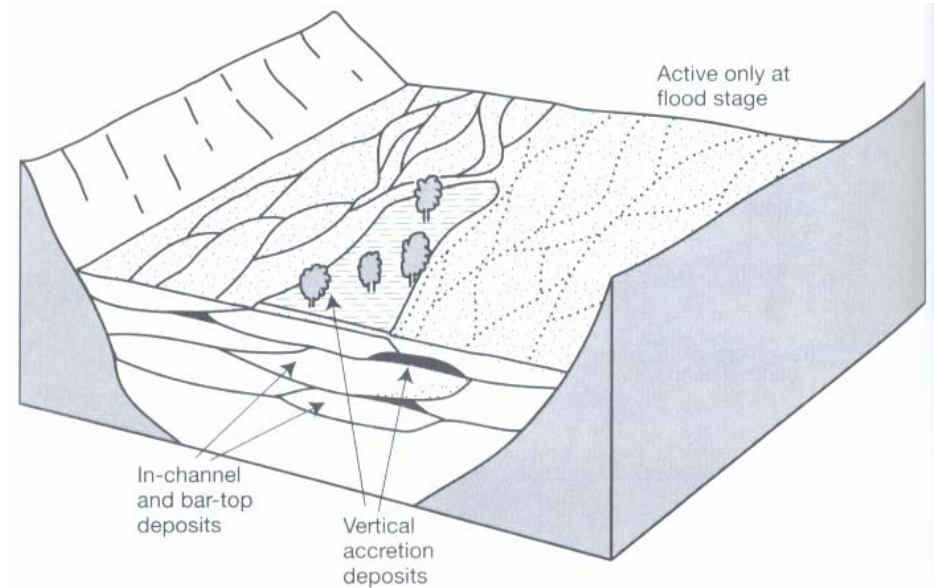
Form in gently sloping terrain, have slower flow, and a sediment load of smaller grain size.



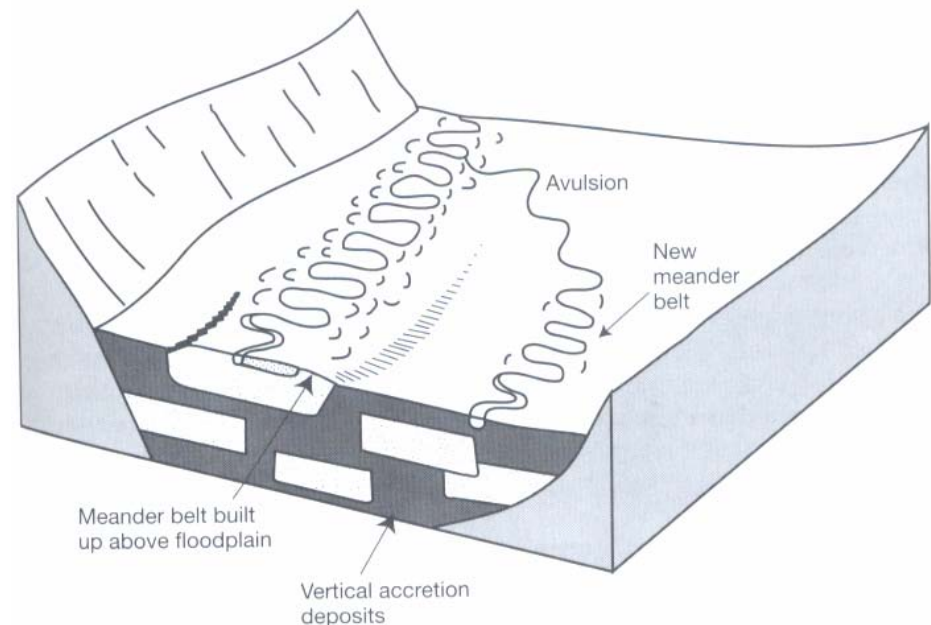
Missouri River
Boonville, Missouri
maps.google.com

Details of sediment packages

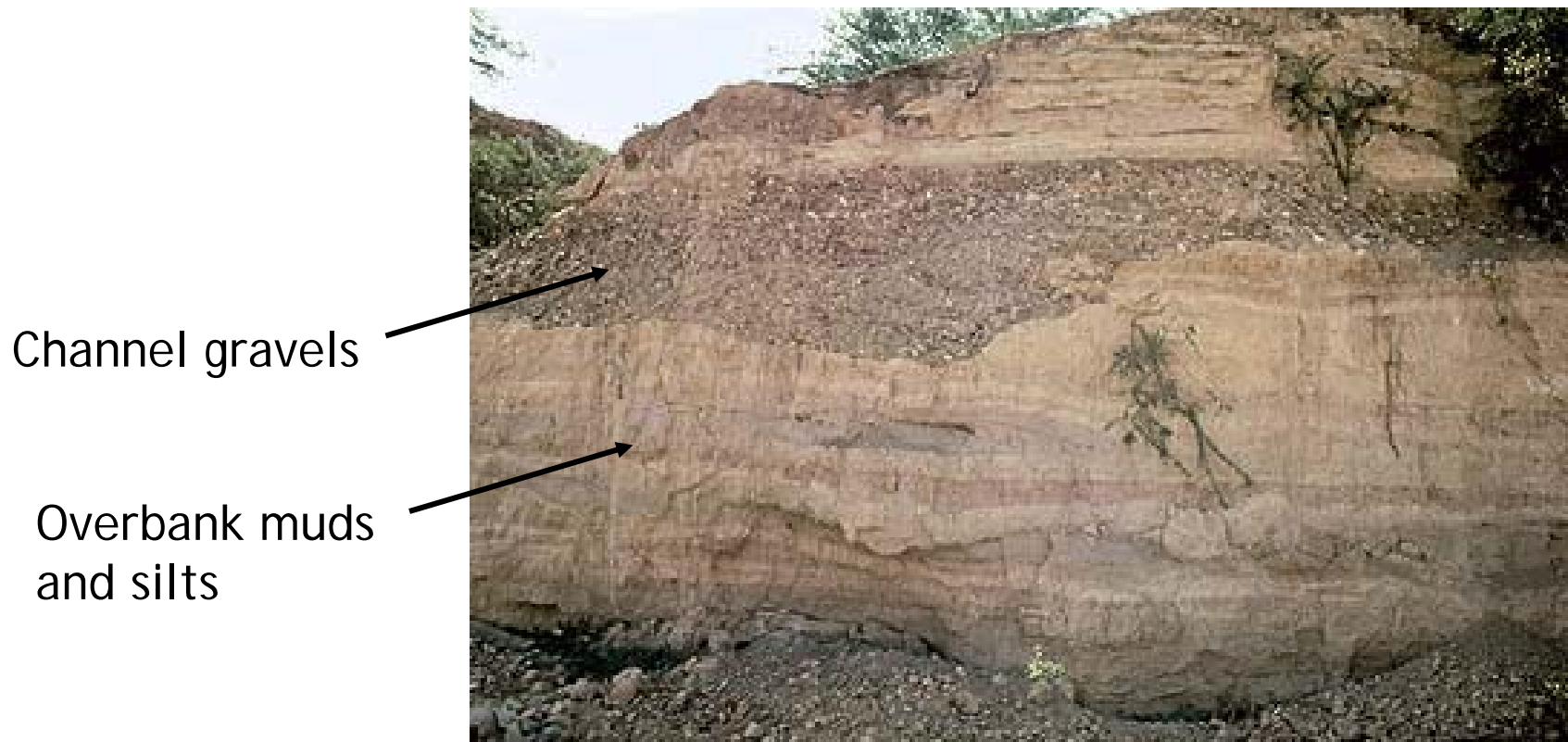
Braided streams produce coarse-grained deposits that imbricate laterally and vertically because the channels shift continuously.



Meandering streams produce finer-grained deposits that are less laterally and vertically continuous because the meanders shift radically when they shift.



Stream deposits in the geological record



Glacial deposits

Sorting is poor or absent because ice is not a fluid and general principles do not apply.

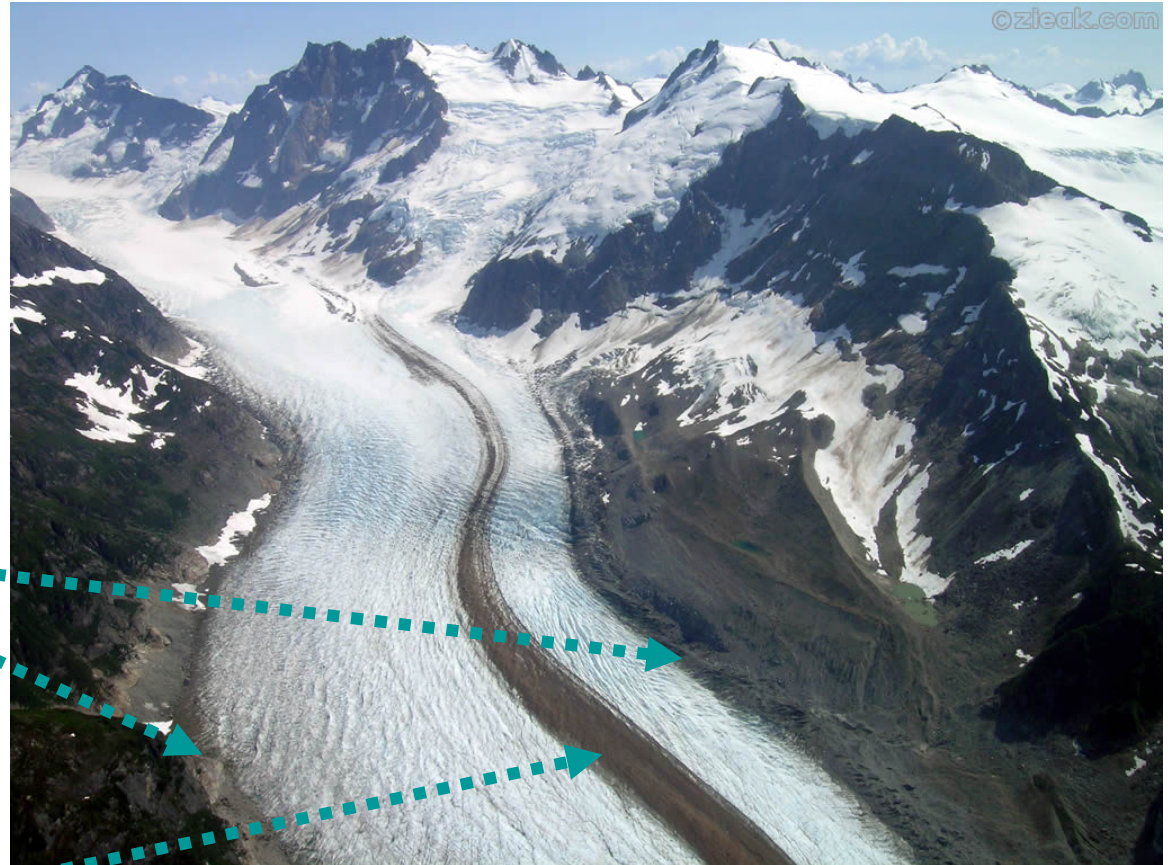
Glacial Till - a general accumulation of sediments dropped from glacial ice.

Moraines - accumulation of clasts in piles or ridges at the edge or end of a glacier.

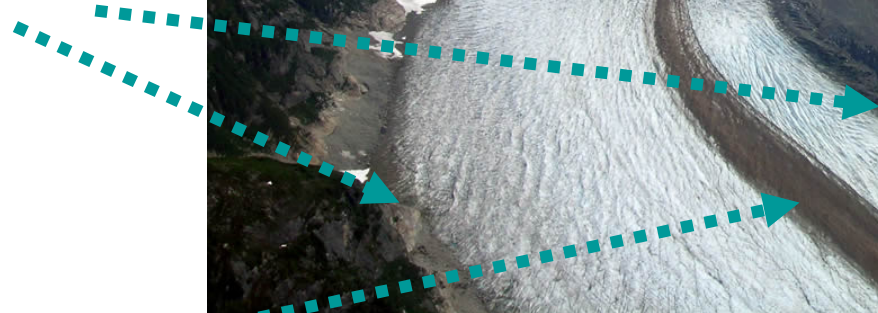
Eskers - accumulation of gravels and sands left by water flow under the glacier.

Loess - wind-blown silt that accumulates during glacial periods.

Moraine- sediment
deposited from
glacial melt



Lateral moraines



Medial moraine



Also Terminal moraines
at the foot of a glacier

Glacial Till- poorly-sorted glacial deposits



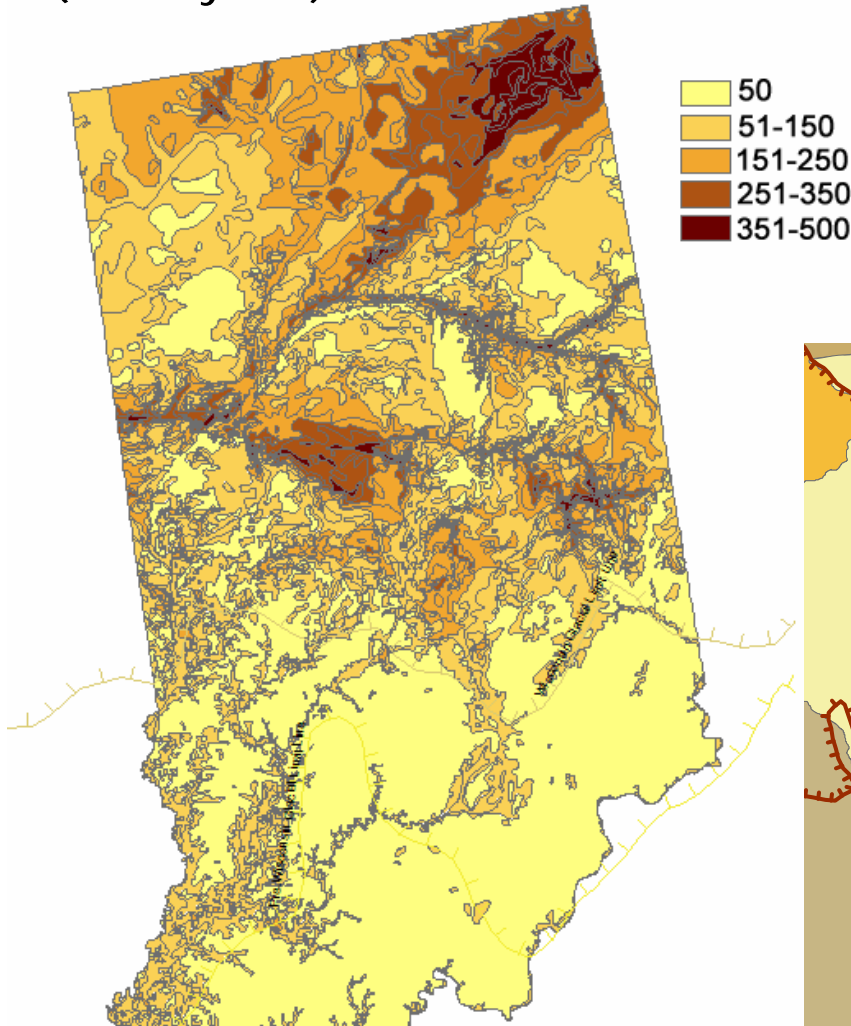
Eskers- elongate ridges running parallel to glacial flow.



Thickness of unconsolidated deposits (mostly till)



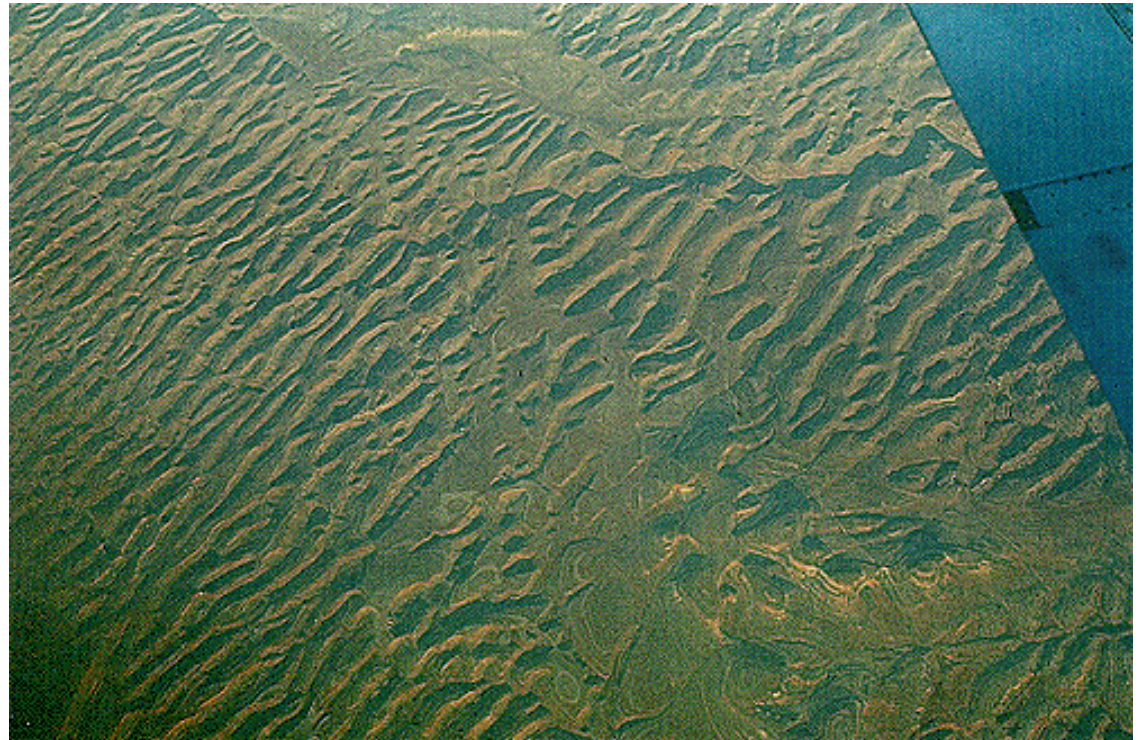
630 ft

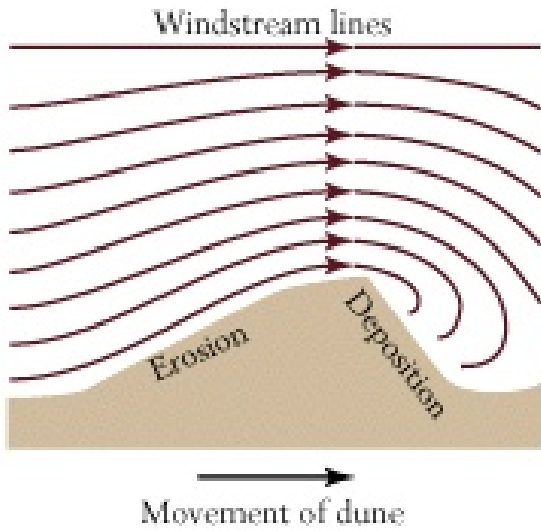


Limits of glaciation

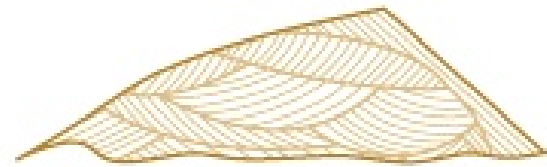


Desert deposits
characterized by dunes (large flow structures).





A



B



C

Jurassic age dune structures
Navaho sandstone
Arizona

Evaporite depositional environments

