

**Measuring sediments**  
**EPSC 240, Geology in the Field**  
Sept 17, 2018

**Key concepts for Week 3:**

*Bedding:* Clastic and chemical sediments are deposited in layers called beds, which form the smallest lithologic units. This term can be used at any scale (e.g., a bed may be made up of alternating sand and clay, or each sub-layer can be referred to as a bed). Bedding contacts may be parallel (if the bedding is tabular) or they may intersect (some beds are wedge-shaped or lenticular). This term is used for both sedimentary and volcanic rocks.

*Contact:* The interface between two rock units. Can be a depositional contact (if one bed is deposited over another), an intrusive contact (if one rock breaks through another, as in the contacts of the Mt Royal dykes), or a tectonic contact (if the rocks have been brought together along a fault).

*Classification of clastic sediments:* Rocks may contain only one grain size (well sorted) or two very different grain sizes (bimodal) or perhaps a mixture of lots of grain sizes (poorly sorted). The shape of the grains records how much abrasion they have experienced during transport, so can give some (relative) idea of the distance between source and deposit.

Sizes:

Shapes:

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| <ul style="list-style-type: none"><li>• Clay = &lt; 5 <math>\mu\text{m}</math> (0.005 mm)</li><li>• Silt = 5 - 60 <math>\mu\text{m}</math></li><li>• Very fine sand = 60 - 125 <math>\mu\text{m}</math></li><li>• Fine sand = 125 - 250 <math>\mu\text{m}</math></li><li>• Medium sand = 0.25 - 0.5 mm</li><li>• Coarse sand = 0.5 - 1 mm</li><li>• Gravel = 2 mm - 6.4 cm</li><li>• Cobble = 6.4 - 25.6 cm</li><li>• Boulder &gt; 25 cm</li></ul> | <ul style="list-style-type: none"><li>• <i>Roundness:</i> sharpness of the corners of a grain<ul style="list-style-type: none"><li>– Very angular</li><li>– Angular</li><li>– Sub-angular</li><li>– Sub-rounded</li><li>– Rounded</li><li>– Well-rounded</li></ul></li><li>• <i>Sphericity:</i> the aspect ratio (long axis to short axis ratio) of a grain<ul style="list-style-type: none"><li>– Equant</li><li>– Elongate</li></ul></li></ul> |
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*Sedimentary structures:* The arrangement of grains within beds, and the shape of contacts, can preserve information about the environment where the sediments were deposited. These are primary structures.

See [https://en.wikipedia.org/wiki/Sedimentary\\_structures](https://en.wikipedia.org/wiki/Sedimentary_structures) for more examples and detailed descriptions.

- *Graded bedding:* Grain size is coarser at the base of a bed, and gradually becomes finer toward the top (indicates slowing current energy). Inverse grading is also possible, usually in landslides and debris flows.
- *Ripple marks:* Indicators of flowing water or sometimes wind, as seen on a contact surface. If they are asymmetrical, it means the current flowed in one direction (perpendicular to the axis of the ripples). If they are symmetrical, it means the current flowed back and forth, e.g., tidal currents.
- *Cross bedding:* Curved, steeper surfaces of aligned grains within a bed, occurring at an angle to the main bedding plane (so they appear to be crossing), formed by migration of ripples.