KINEMATICS (1)

I   Main Topics
  A Definition and use
  B Relative ages
  C Displacements vs. relative displacements

II Definition and use

  A The study of the position of bodies through time without regard to
     the forces causing motion

  B Used to describe how a body changes position, orientation, shape,
     and/or size through time

III   Relative ages

  A Cross-cutting relationships

    1 Younger features can cut older features; older features cannot cut
       younger ones

    2 Examples

      a Unconformities

        a Angular unconformities

        b Nonconformities

      b Dikes

      c Joints

      d Faults

      e Plutons (can cut older deformed rocks)

    3 "Pathologic" examples

      a Pay careful attention to relative displacements, what you don't
         know, and stay sharp

      b Einstein: "I had to divest myself of intuition - then I could
         think clearly (Press and Siever, 1978, p. 133)

B Inclusions

    1 Older material (e.g., xenoliths) can be incorporated in younger rocks

    2 Examples

        a Igneous inclusions

        b Sedimentary inclusions (e.g., shale rip-up clasts)

C Interaction of structures

    1 Older structures can affect the initial formation of younger structures, but younger structures cannot affect the origin of older structures

    2 Examples

        a Tee-shaped intersections: the "crossbar" is older

        b Curving fractures

D Paleomagnetic phenomena: paleomagnetic poles can predate or post-date folding (for example)

IV Displacements vs. relative displacements

A Most of the displacements geologists measure are relative displacements (GPS is sort of the exception)

B A lack of relative displacement does not equate to a lack of absolute displacement (examples: joints and faults)

C Structural geologists usually cannot measure displacements relative to an undeformed initial state; we only see the final deformed state

D Models influence what we measure, where we measure, and how we interpret our measurements

    1 Faults and joints (see B)

    2 Dependence on our concept of the initial state: is it deformed or undeformed?

"PATHOLOGICAL" EXAMPLES　　　Fig. 12.1

Is this a dike or a fault?

Is this a dike or a fault?

Is this a dike or a fault?