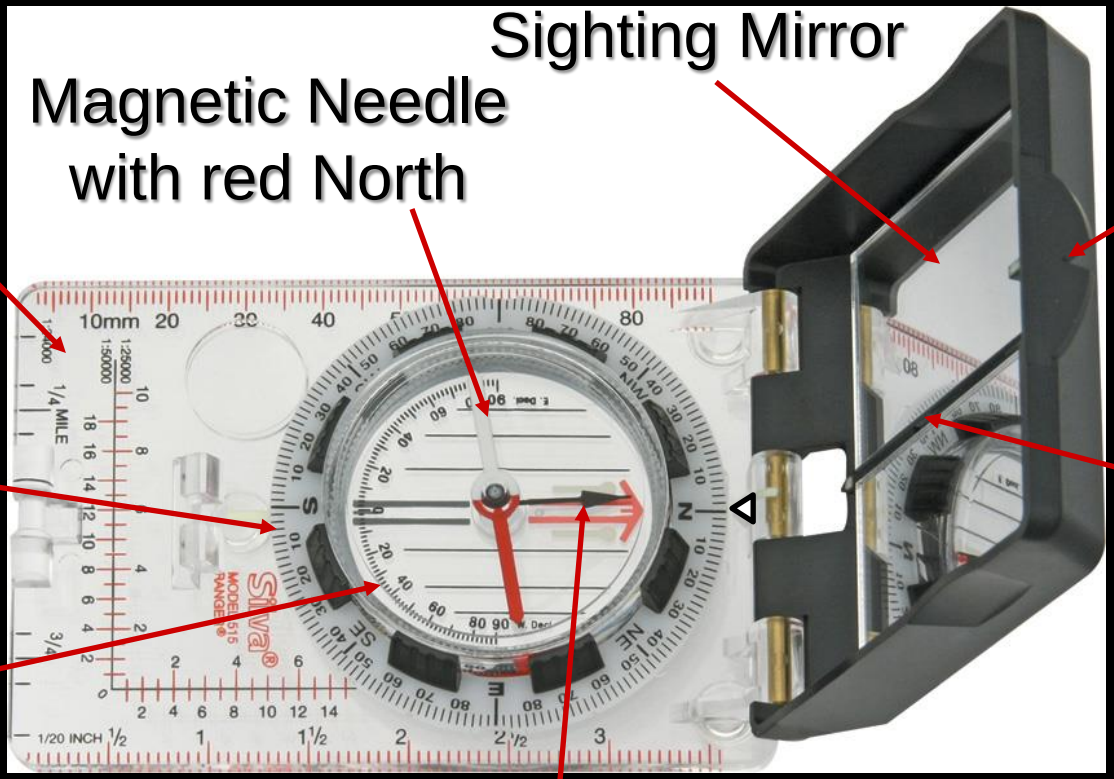
Introduction to the Silva Ranger Compass

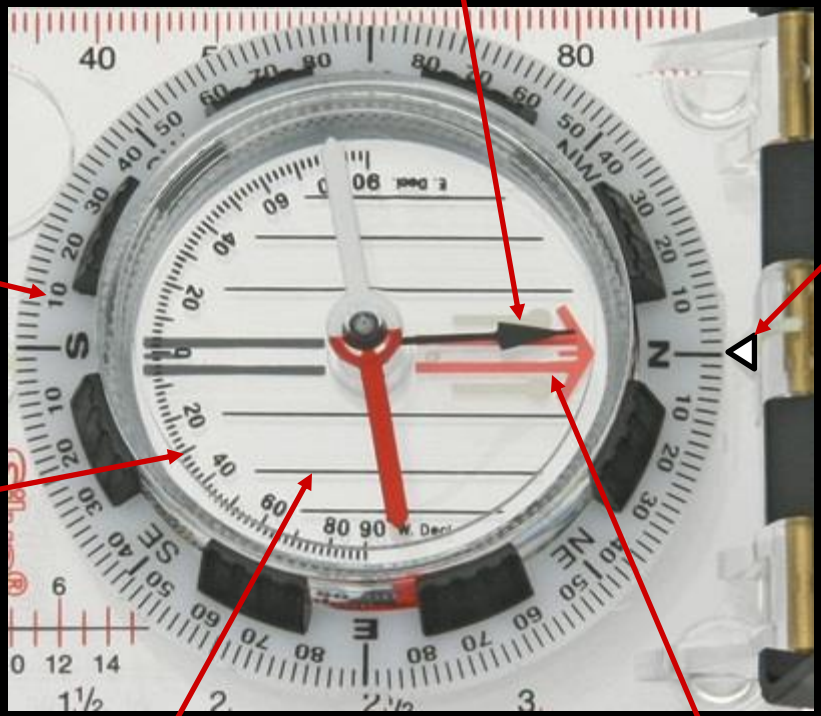
M. Helper, Jackson School of Geosciences, UT Austin

Parts of the Silva Ranger Compass



M. Helper, Jackson School of Geosciences, UT Austin

Parts of the Silva Compass Face



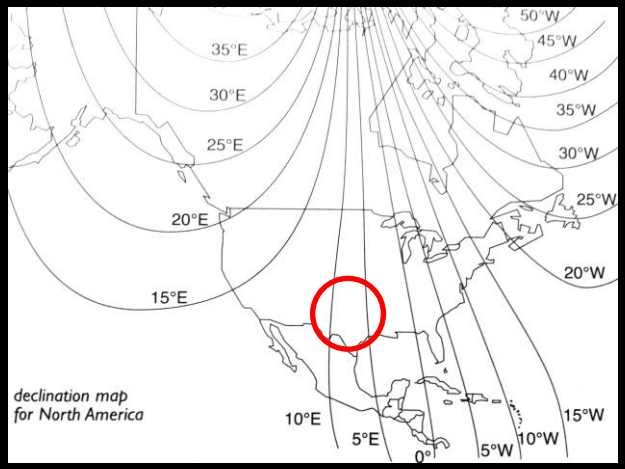
M. Helper, Jackson School of Geosciences, UT Austin

Compass Mastery

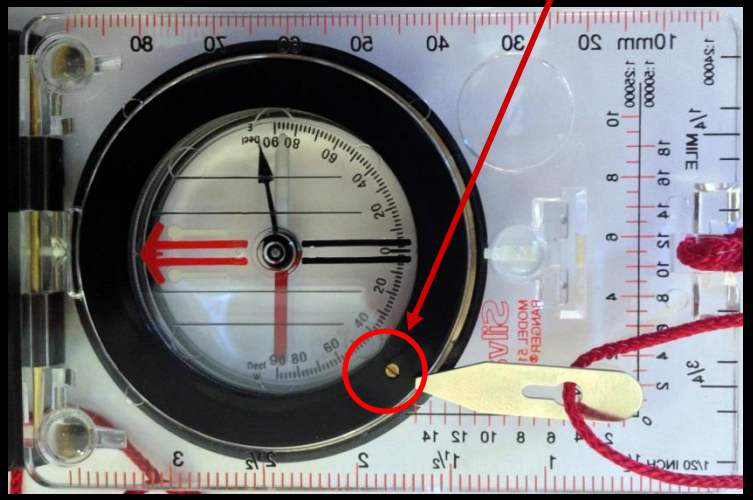
- Locate North, Set local declination
- Measure Bearings
- Measure Strike and Dip of planes
- Measure Trend and Plunge of lines
- Measure Vertical Angles
  - measuring height / thickness of a feature

To Set Magnetic Declination:

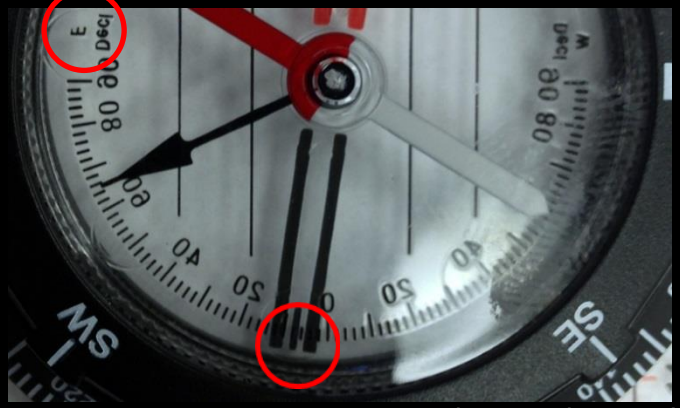
1. Determine local declination, e.g. Austin 6.5º E



2. Adjust with screw on back

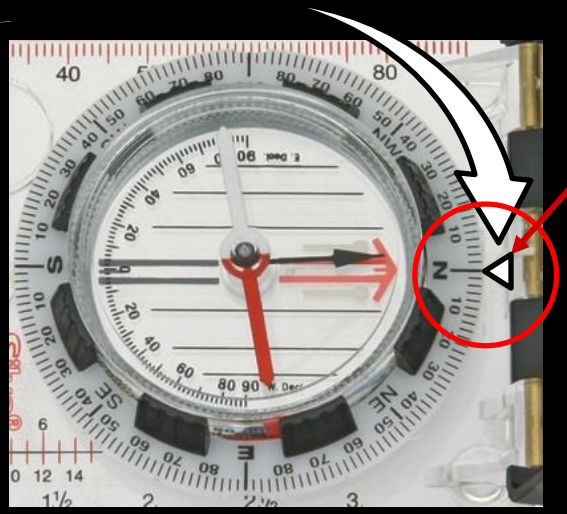


3. Declination properly set

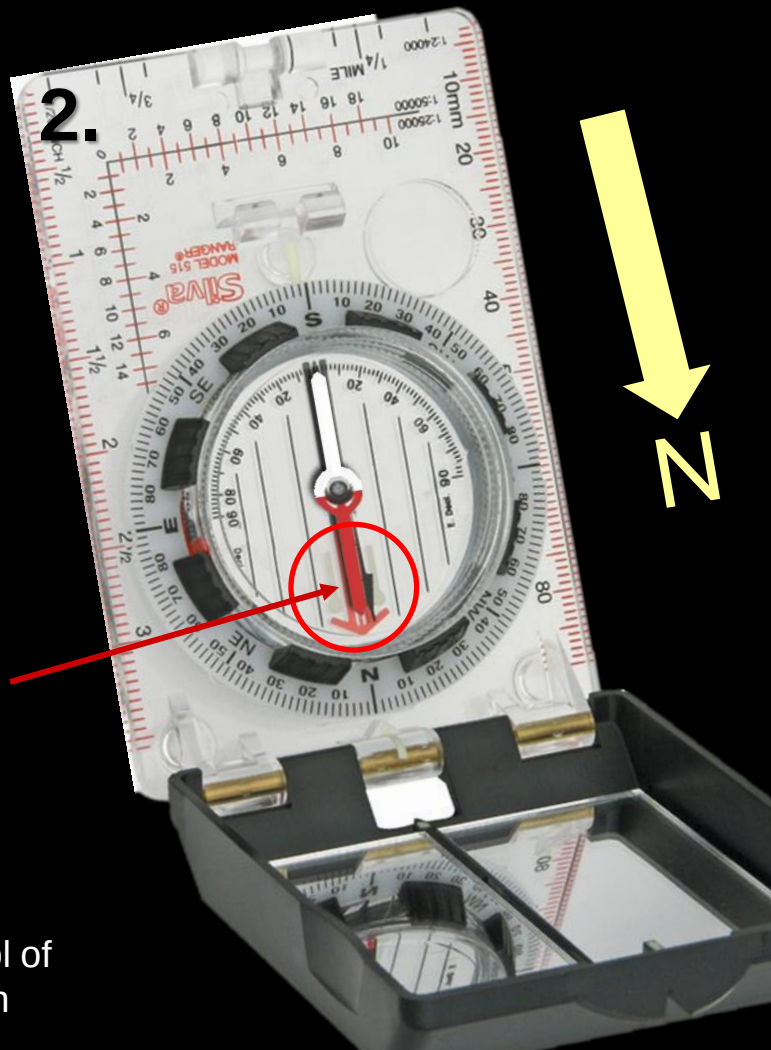


To Align Compass to North:

1. Rotate <u>Bezel</u> until “N” aligns with Index Pointer



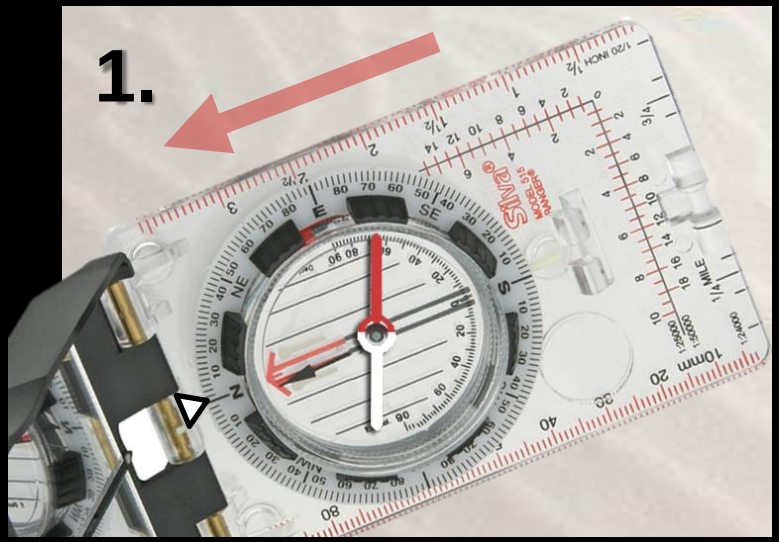
2. Rotate <u>Compass</u> until “Red on Red”

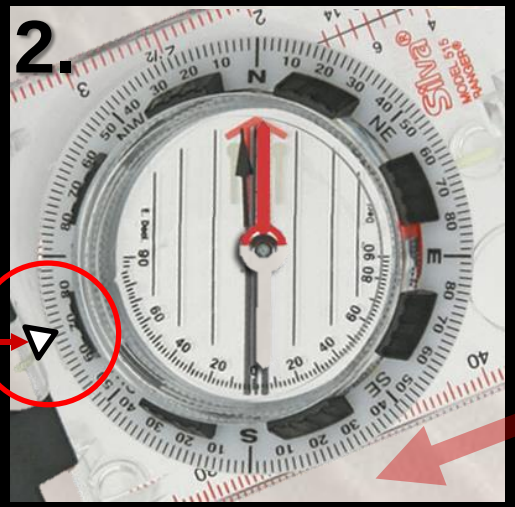


M. Helper, Jackson School of Geosciences, UT Austin

Measuring a Bearing

<u>Bearing</u>: direction from one point to another

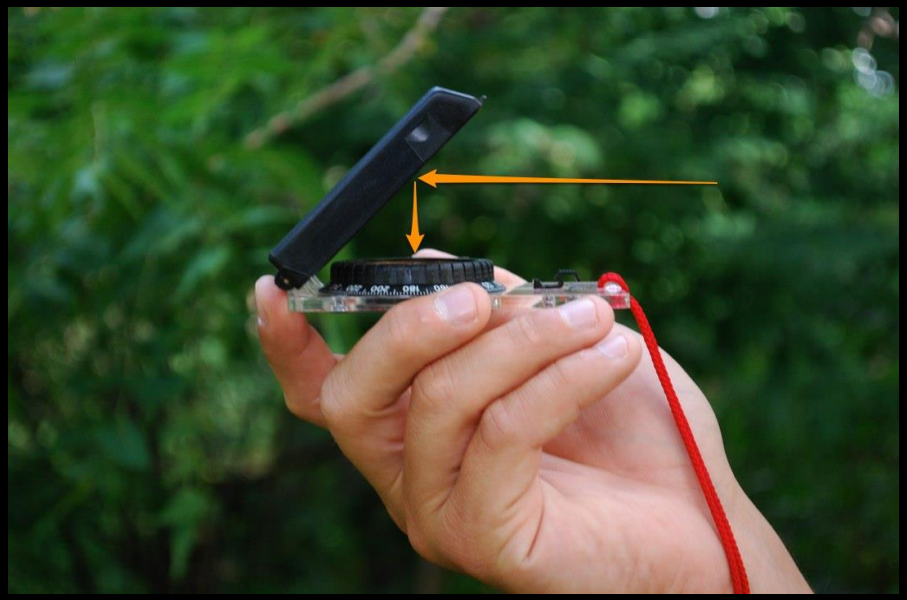


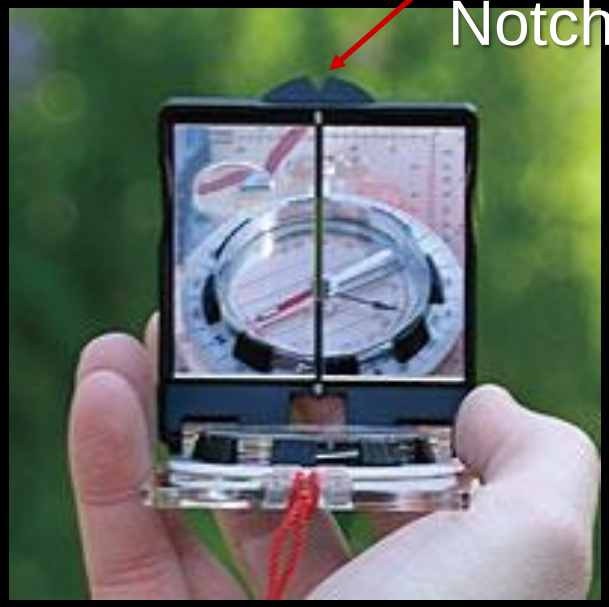


1. Point or sight compass in desired direction
2. Rotate <u>Bezel</u> until “Red on Red”
3. Read Bearing at Index Pointer

M. Helper, Jackson School of Geosciences, UT Austin

Sighting a Bearing





Images from: http://www.flickr.com/photos/esagor/2674625982/

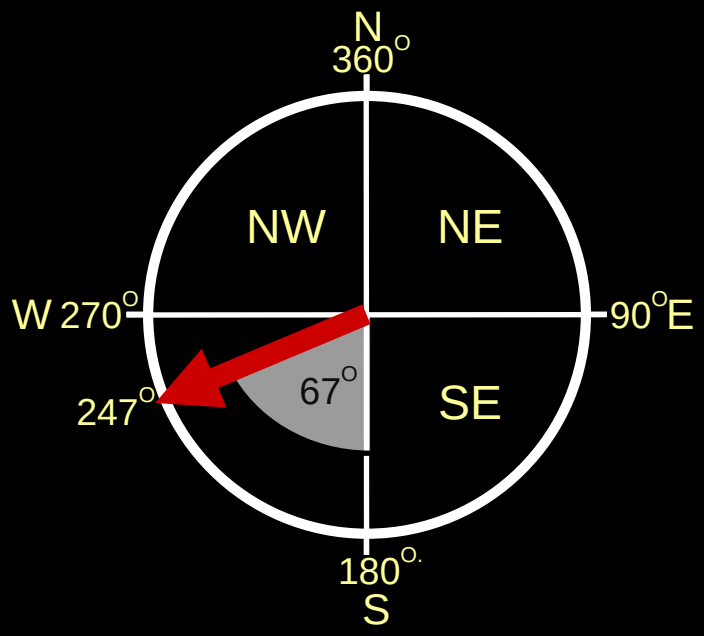
1. Hold compass level, sight through notch
2. Rotate Bezel to “Red on Red”
3. Read Index Pointer

Recording a Bearing

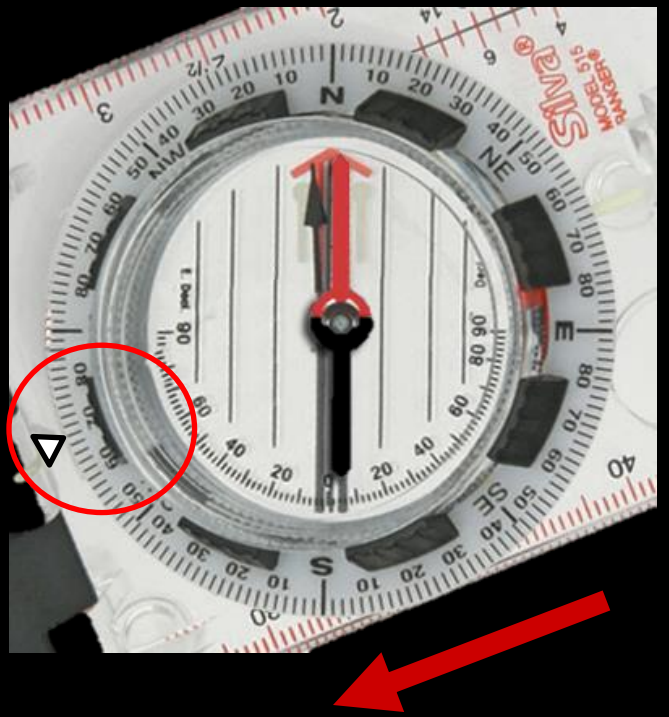
<u>Bearing</u>: direction from one point to another

Recording notations:

- Azimuth: "247°"

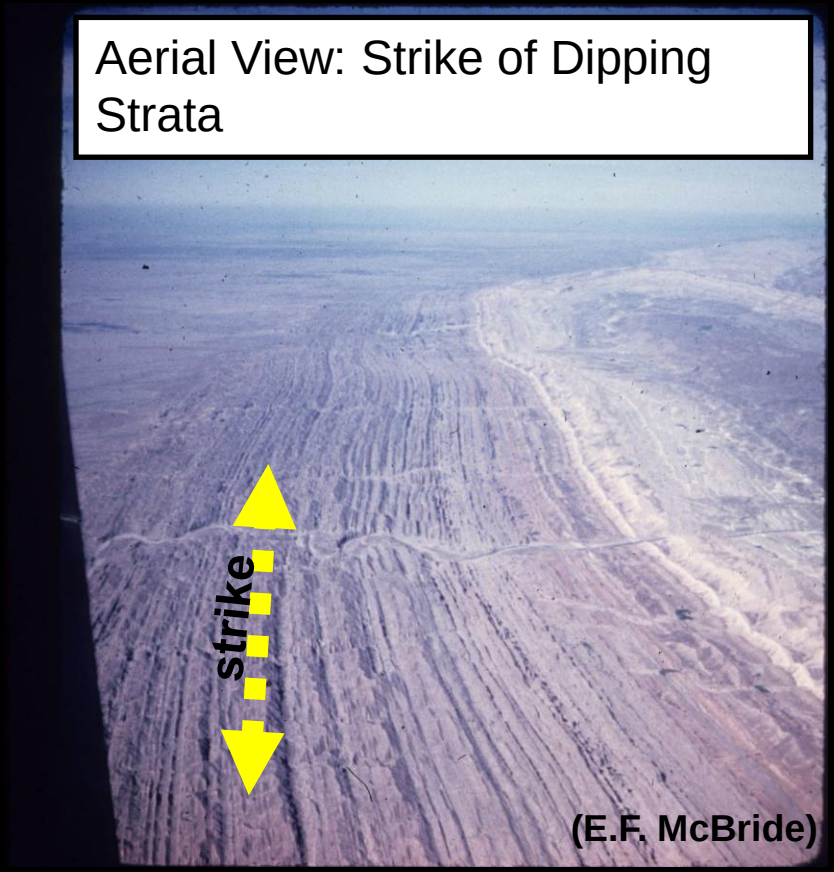


- Quadrant: "S 67°W"



Measuring Strike

Strike: A bearing that is the direction of the line of intersection between a tilted plane and a horizontal plane



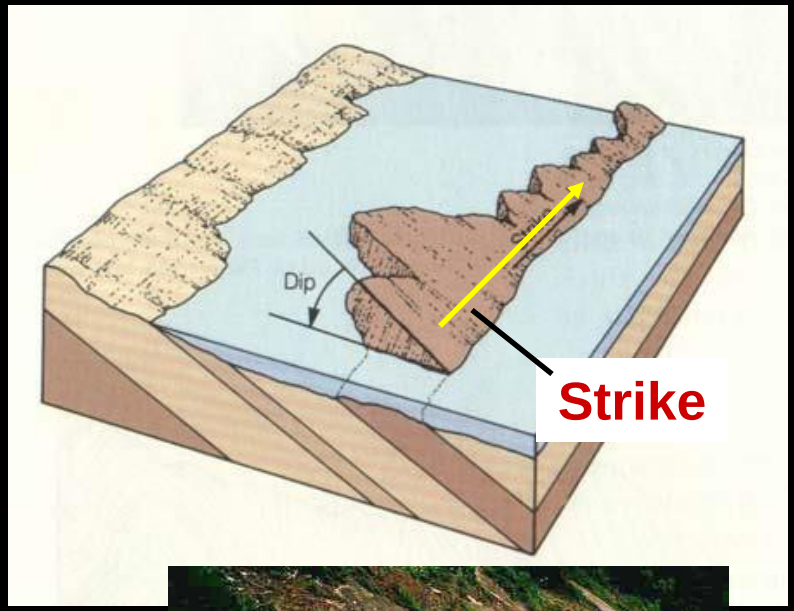


Image from: http://courses.geo.ucalgary.ca/glgy203/images/sd.htm

Measuring Strike

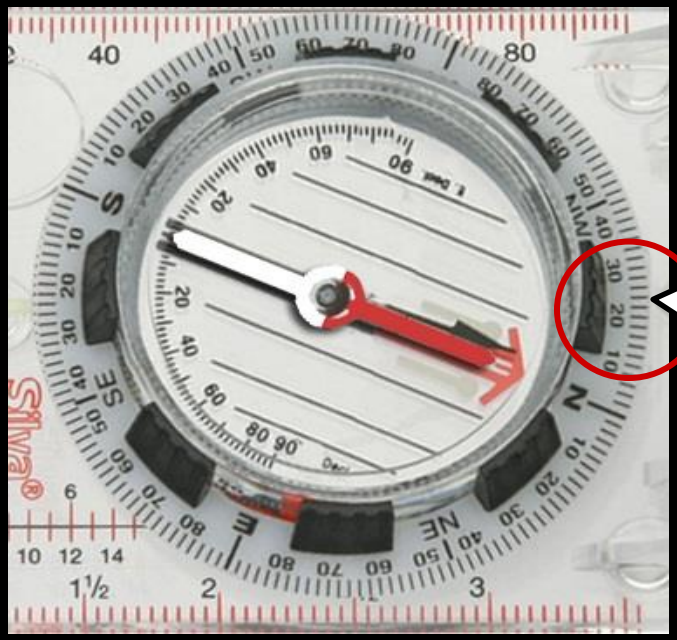
Measuring a field book that defines the tilted plane of interest

M. Helper, Jackson School of Geosciences, UT Austin

Measuring Strike

Strike: Direction of the line of intersection between a tilted plane and a horizontal plane. A special bearing.

Background image: http://courses.geo.ucalgary.ca/glgy203/images/sd.htm



Index Pointer (N23°W or 337°)

- Compass must be horizontal (bull's eye bubble centered), with compass edge flush to the tilted plane

Recording Strike

In the picture at left, is the strike azimuth 157º or 337º?

Right-hand Rule:

Record the bearing in the direction that places the dip direction of the plane to the right (clockwise from) strike. *Answer: 337º*

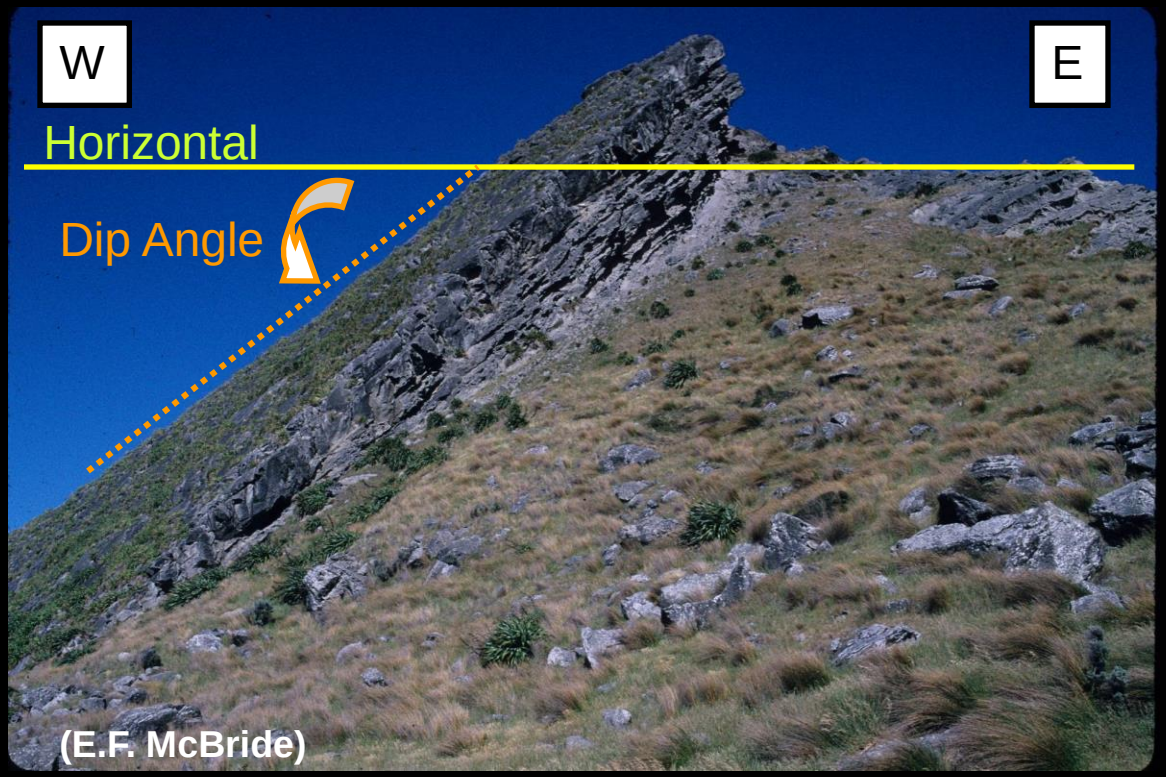
Images from: http://courses.geo.ucalgary.ca/glgy203/images/sd.htm

Measuring Dip

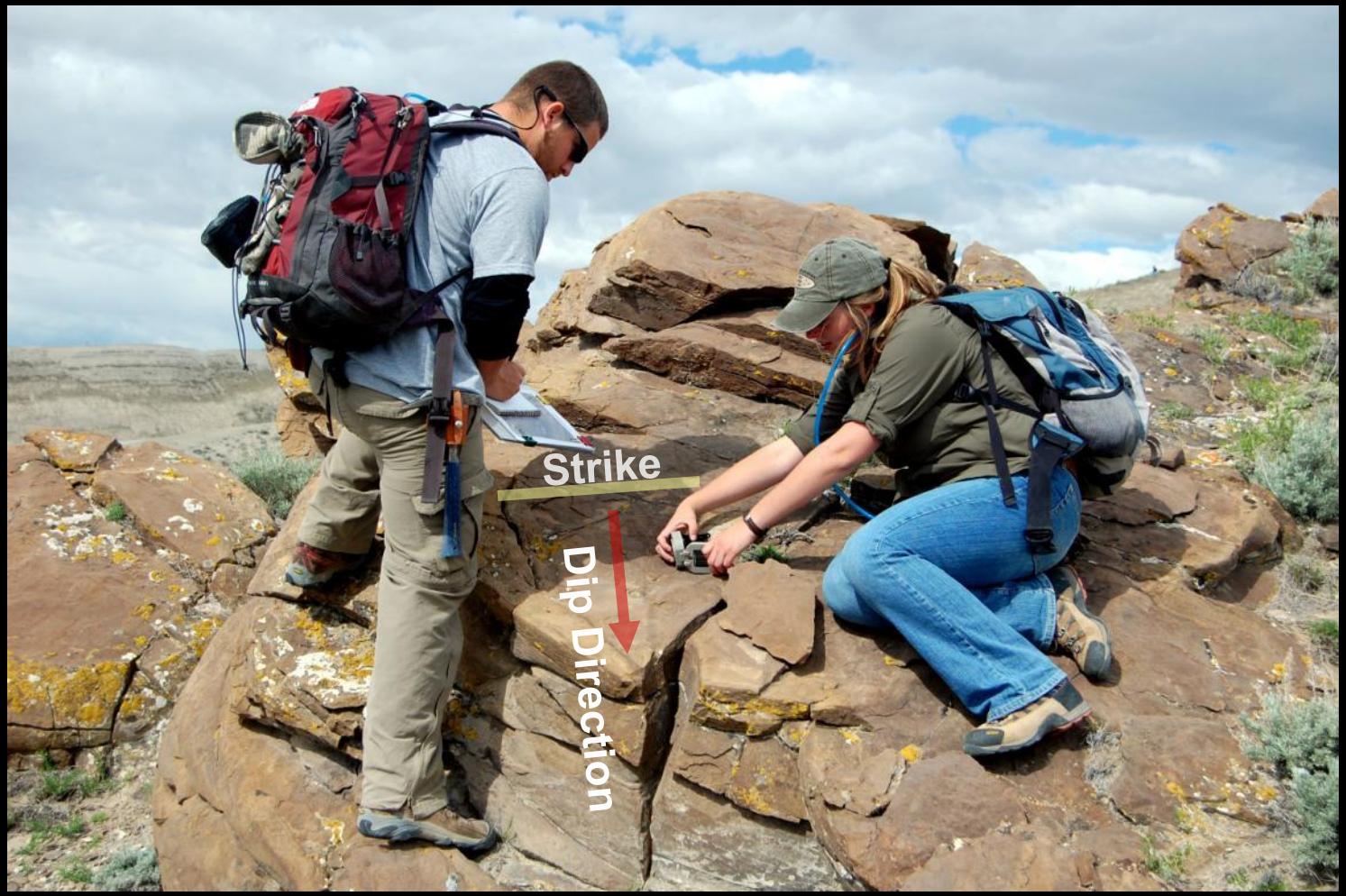
Dip: The maximum slope of a plane, measured from horizontal. The dip direction is always perpendicular to strike.

The dip direction is:

- The “fall line” in skiing
- The direction water runs down a sloping surface
- The direction a pebble rolls down a sloping surface

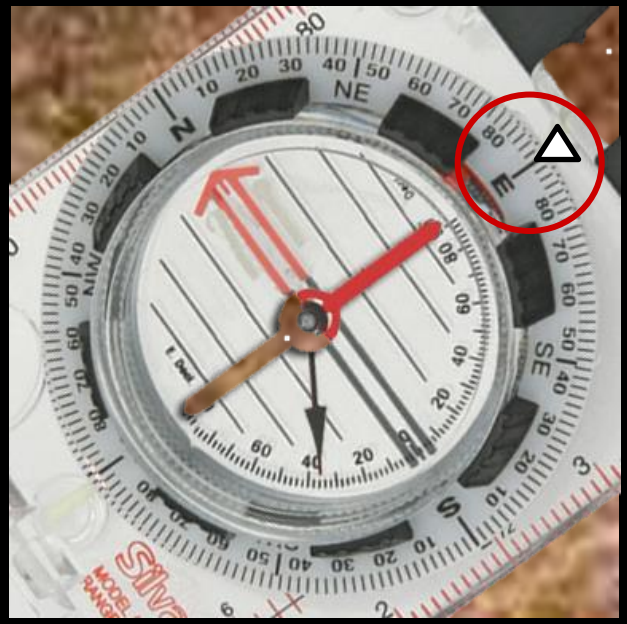


Measuring Dip



M. Helper, Jackson School of Geosciences, UT Austin

Measuring Dip



1. Turn Bezel to E-W

2. Place compass on its side, perpendicular to strike

3. Read the clinometer, i.e. 36^{o}

Recording Strike (Azimuth) & Dip

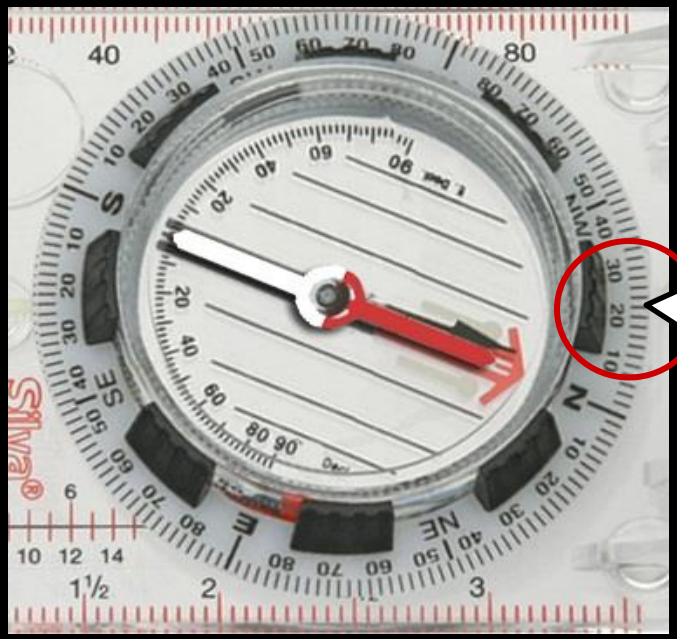
Shorthand Notation:

337/36°

or

337/36° NE

- "NE" records the dip direction, but is redundant if the right-hand rule is followed

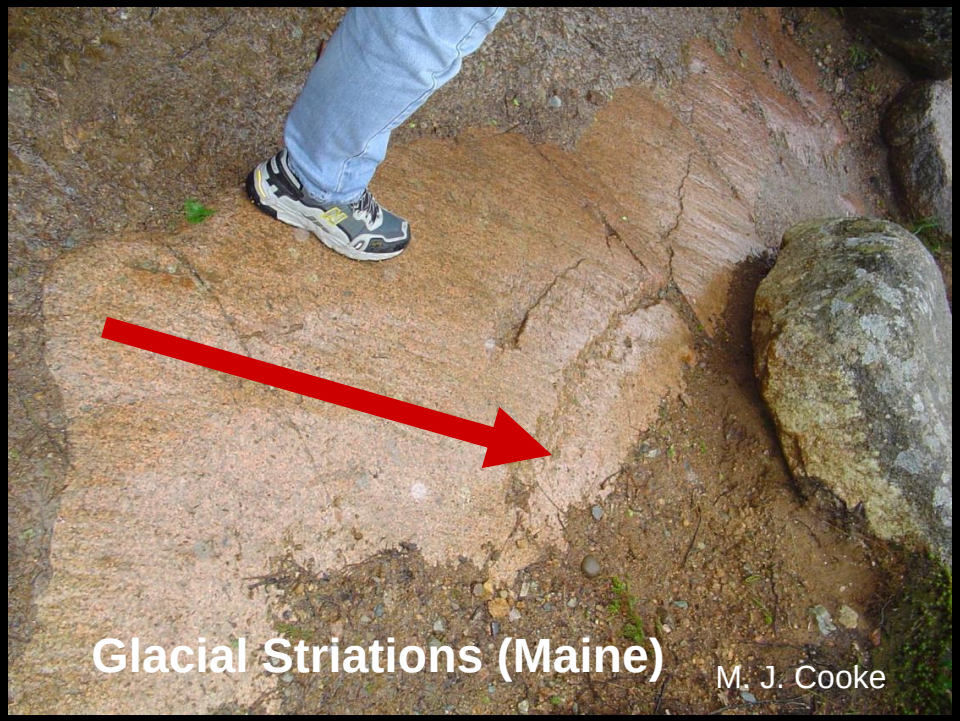


Index Pointer (N23°W or 337°)

Measuring the Trend of a Linear Feature

Trend: The bearing of a line, in the direction that it is inclined.

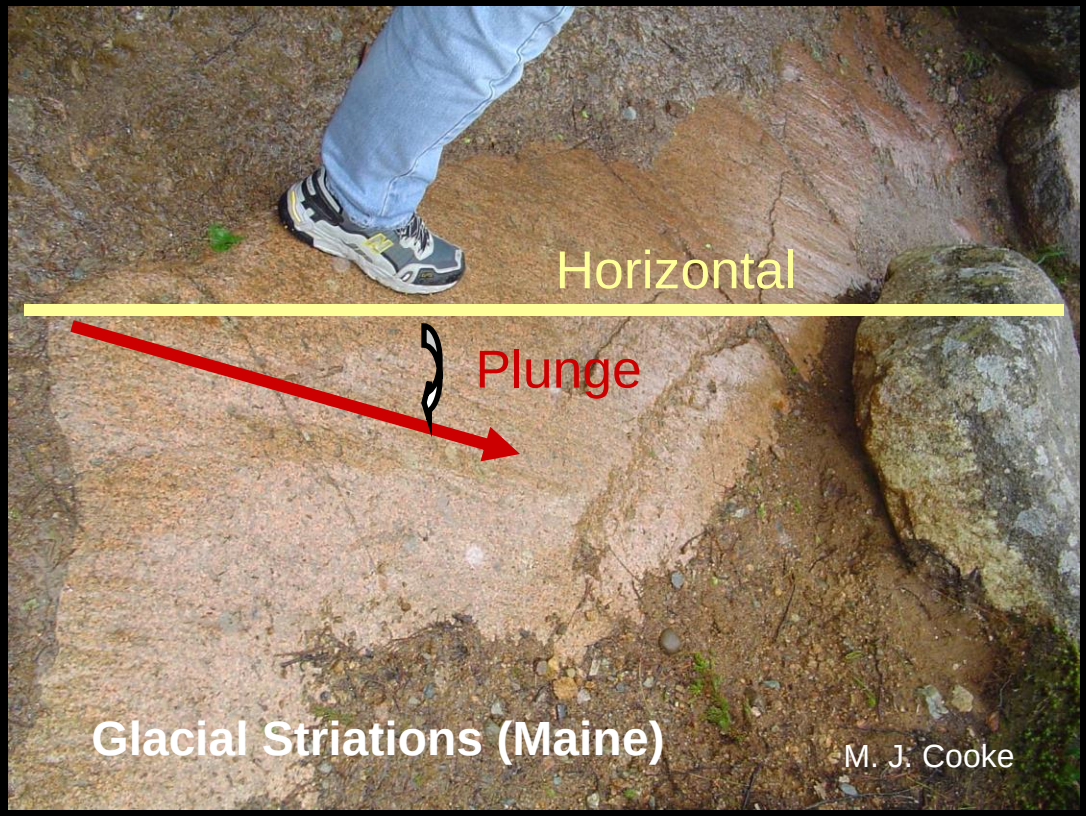
1. Stand over the feature
2. Hold the compass level
3. Measure a bearing in the direction of the lower end of the line



Glacial Striations (Maine) M. J. Cooke

Measuring the Plunge of a Linear Feature

1. Place the side of the compass parallel the feature
2. Measure the angle of the line from horizontal with the clinometer, as done for dip



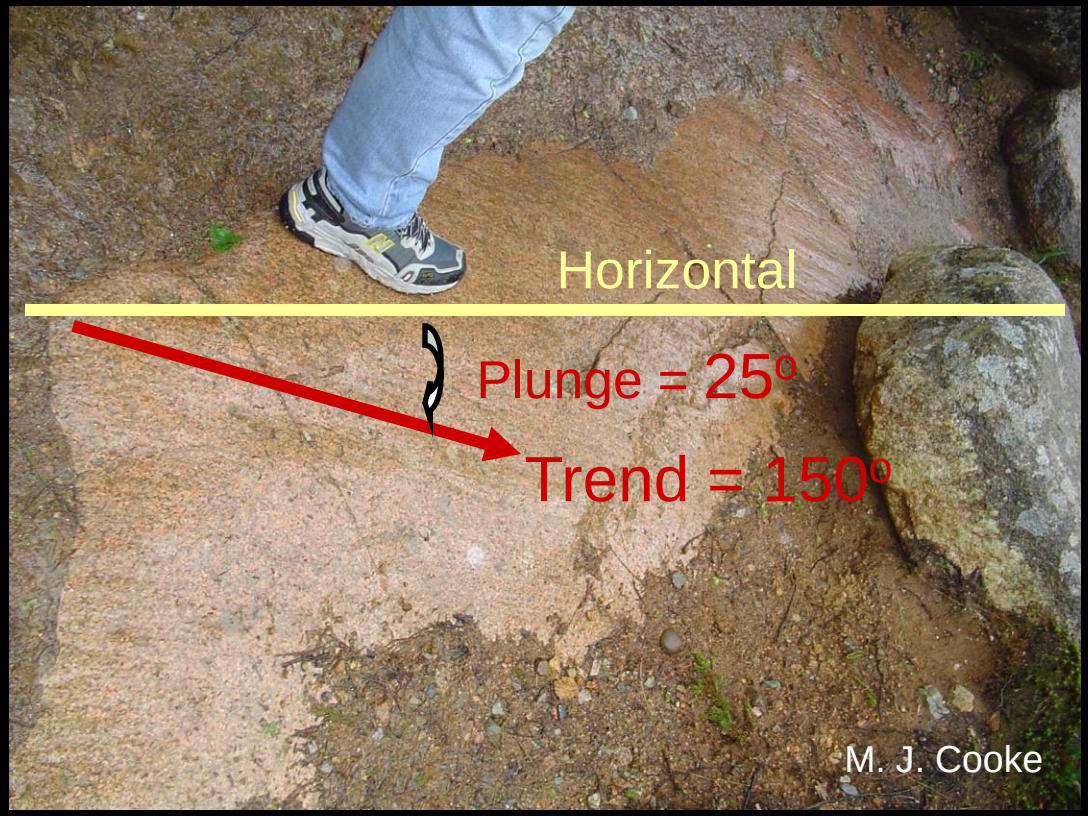
Recording Trend and Plunge of a Line

Shorthand Notation:

"25°/150"

Reads:

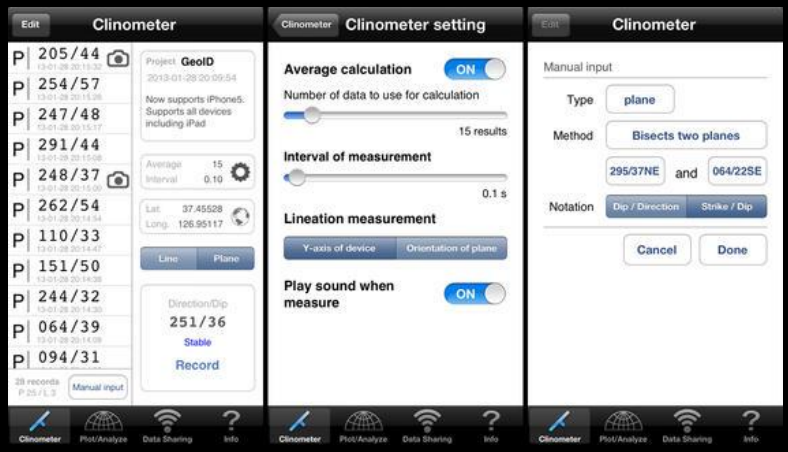
"plunges 25 degrees toward a bearing of 150°"



Smart Phone Compass Apps.

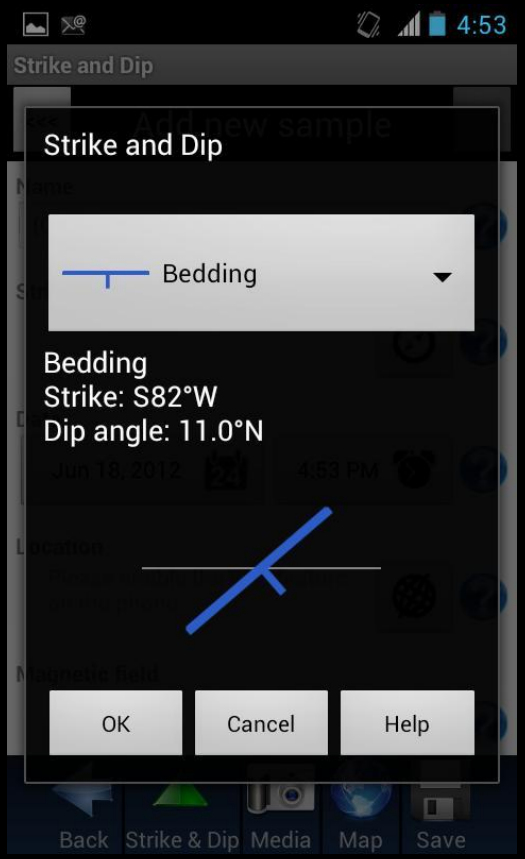
- I-Phone
  - o GeolCompass
    $2.99

  - o GeoID
    $5.99



Smart Phone Compass Apps.

- Android
  - o “Strike and Dip”



Plotting Bearings with a Silva Compass

(using the Silva as a Protractor)

1. Set compass to bearing of interest
2. Orient compass on map so black lines ("Meridian Lines") are parallel to North
3. Draw line using edge of compass as a straight edge

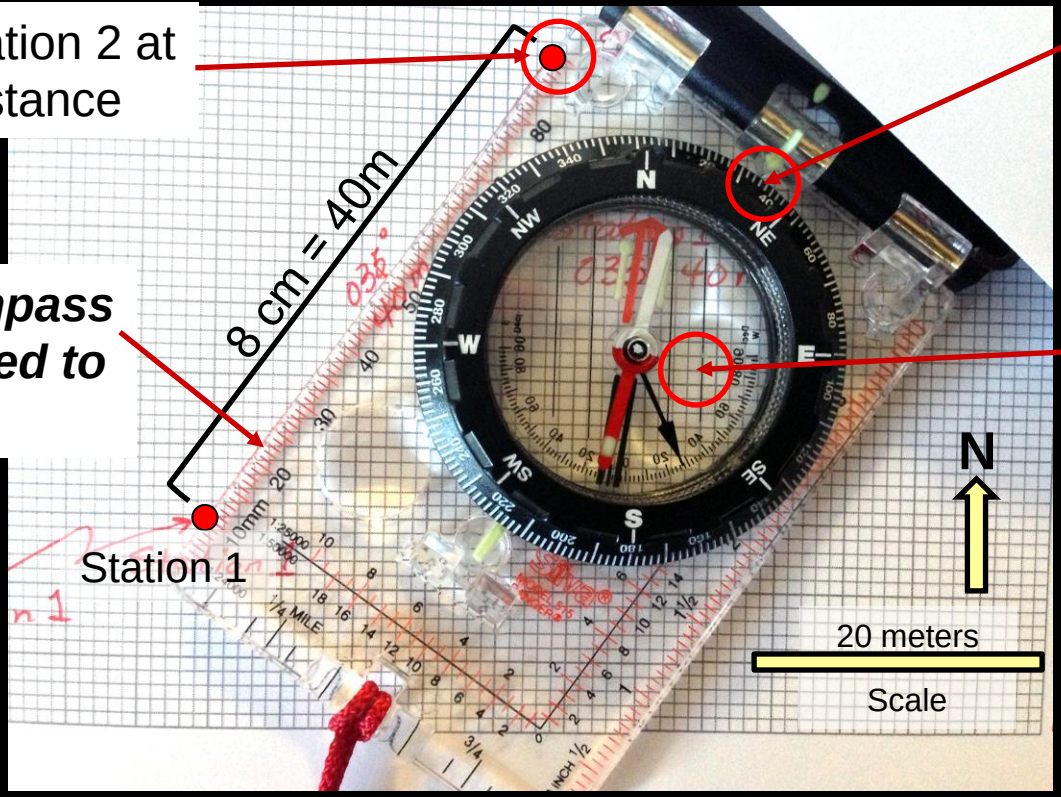
M. Helper, Jackson School of Geosciences, UT Austin

E.g. Pace and Compass Mapping

To plot a bearing from Station 1 to Station 2 of 035° and show them 40m apart:

3. Plot Station 2 at correct distance

Edge of Compass is now aligned to 035°!



1. Set Compass to 035°

2. Align Meridian Lines parallel to North on graph paper (map)

M. Helper, Jackson School of Geosciences, UT Austin