Stereographic Projection

- Planar and linear elements are measured in the field, recorded in the notebook, and plotted on the map.
- Often, analysis of the orientation data is needed and this is done with the powerful stereographic projection.
- Stereographic projection is widely used in mineralogy, rock mechanics, etc. Any discipline that needs to handle orientations of lines and planes.

Step I: Projection Sphere

- Orientation rather than Position!
- A plane passing the center of a sphere intersects the sphere with a great circle (a plane cutting a sphere but not passing its center intersects the sphere with a small circle).
- The great circle is the spherical projection of the plane.
- A line passing through the center of the sphere intersects the sphere at two points, one in upper hemisphere and the other in lower hemisphere – spherical projections of the line.

Step II: Stereographic Projection

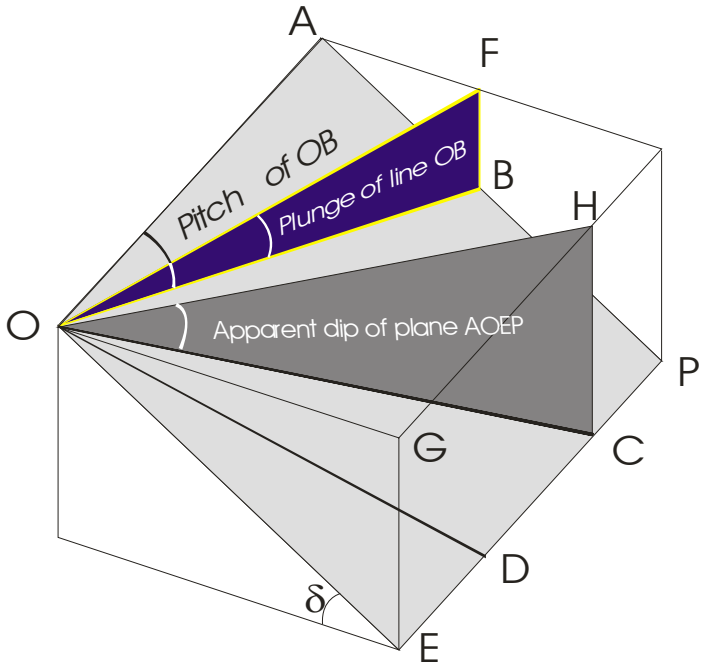
- In order to obtain a 2D projection, we project the spherical projections on to the equator plane.

- The projection is called stereographic projection.

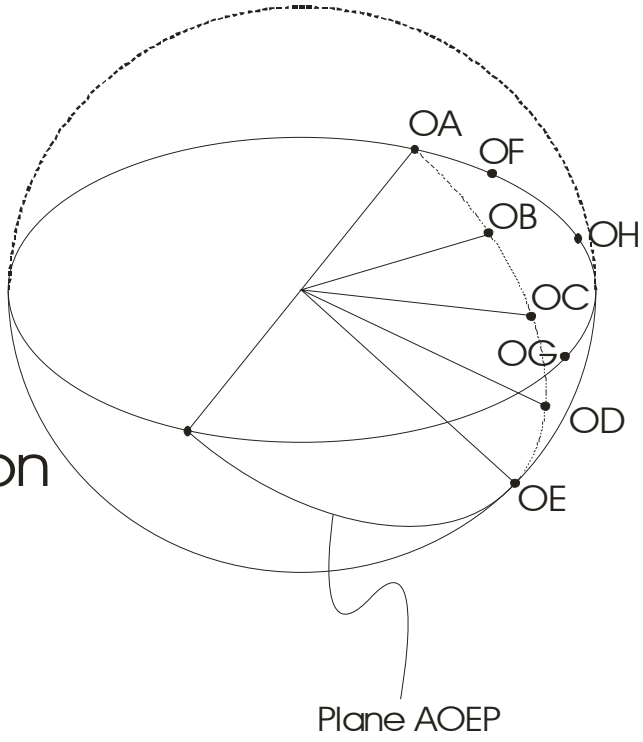
- The viewpoint can be at the topmost point of the projection sphere: Lower hemisphere projection (used in structural geology), or the bottommost point – Upper hemisphere projection. Sometimes both hemispheres are needed.

Plotting Planes and Lines (in-class practice)

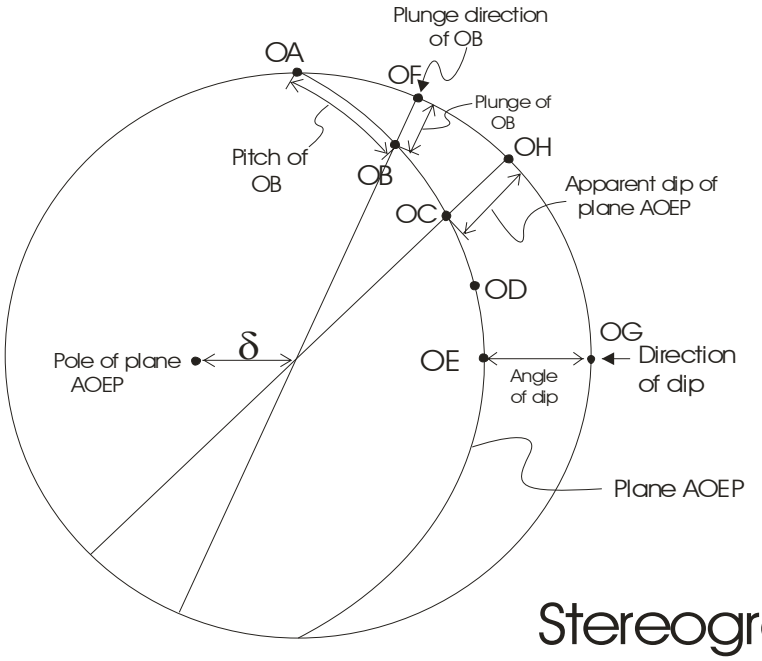
- Plotting planes as great circles.
- Plotting lines as points.
- Reading the dip of a plane from its plot.
- Reading the plunge of a line from its plot.
- Plotting planes as poles to the planes
- Reading pitch of lines on their containing planes
- Intersection line of two planes
- Angle between two planes



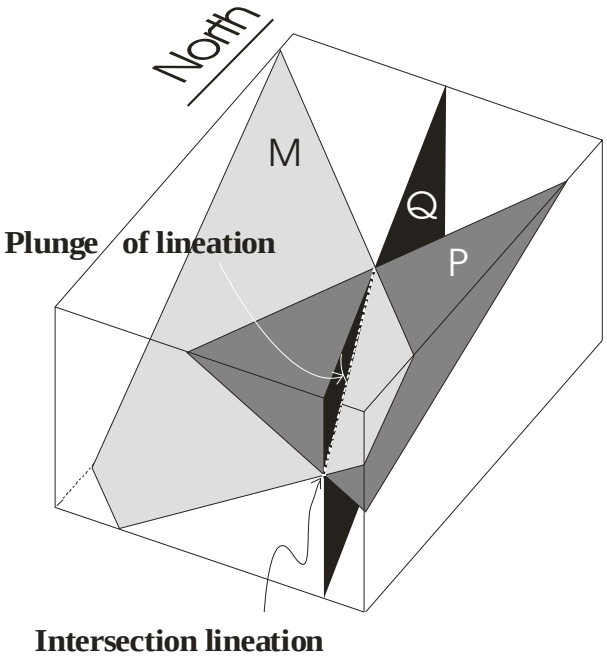
Real space



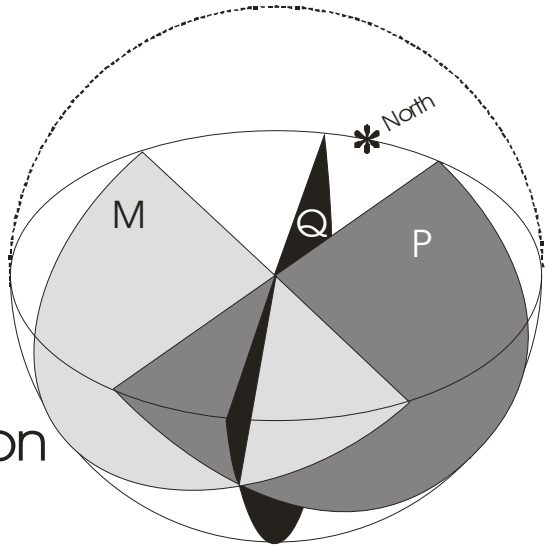
Spherical projection



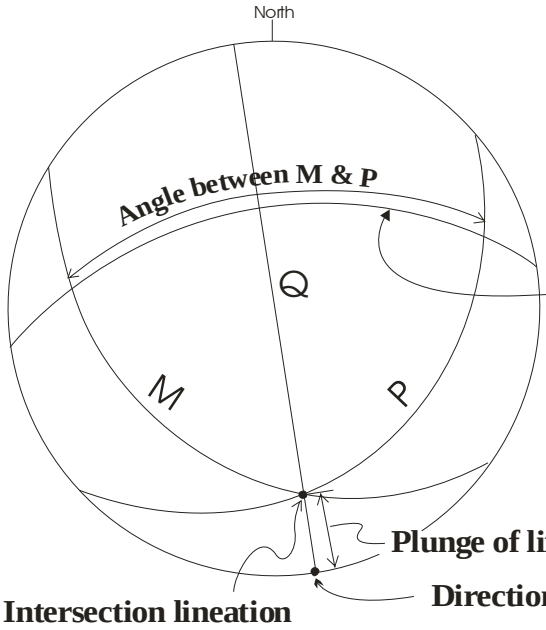
Stereographic projection



Real space



Spherical projection



Stereographic projection

- Please read the assigned materials about stereographic/equal area projection if you still have problems. Or you can come to Prof. Jiang’s office to ask questions…