University of South Australia
School of Natural and Built Environments
Engineering & Environmental Geology (EART 3012)

Kangaroo Creek Dam workbook

Exercise 1

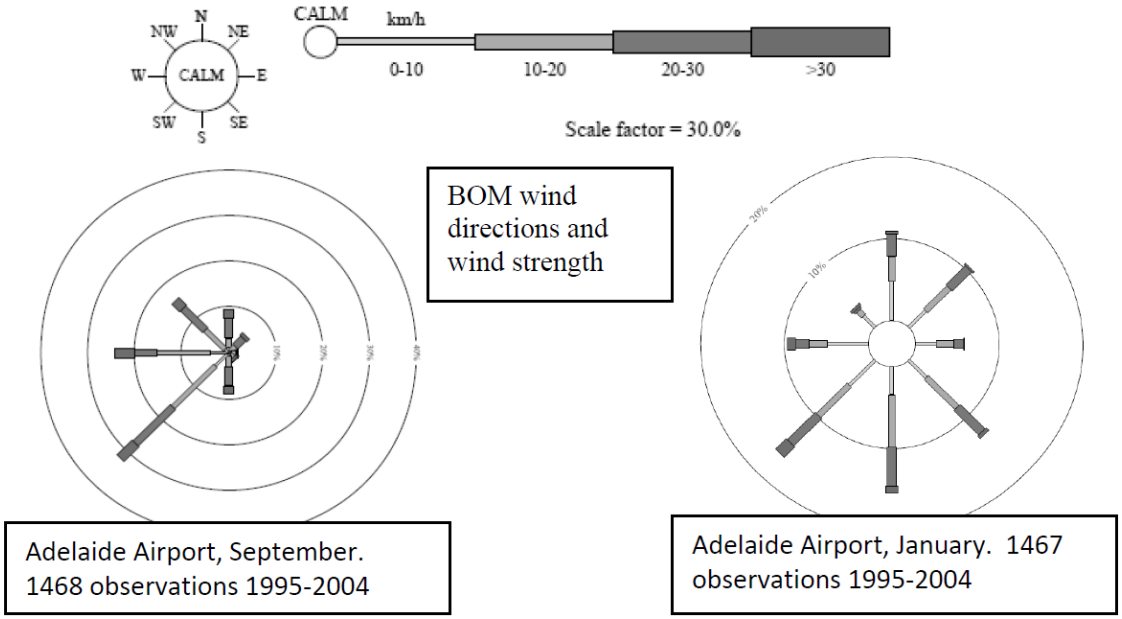
Using your compass or smartphone app, measure the orientation and frequency of all joint sets visible on your section of the Kangaroo Creek northern embankment (adjacent to the road). Also note a brief description of the nature of the joint (e.g. rough, smooth, infilled, planar, curved, etc.). Compile this data in the table below, and also sketch and label the overall structure of the embankment on the graph paper at the end of this handout. Be as accurate as possible by using the tape measure to measure distances between features. **Please note: keep a safe distance from any overhanging rocks or cliffs at all times and follow staff instructions.**

Orientation data from northern embankment

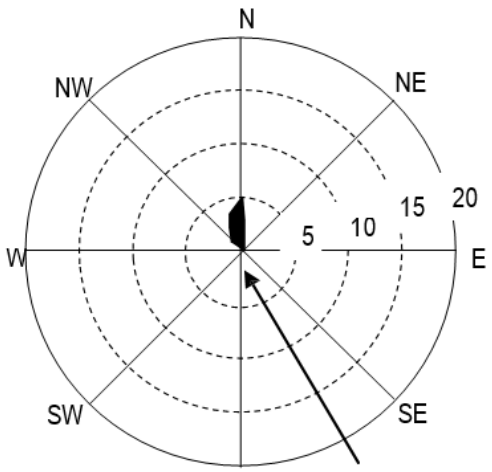
DIP DIRECTION OF JOINT	DESCRIPTION OF JOINT AND NUMBER OF MEASUREMENTS (INDICATE WITH TICKS)	GROUP TOTAL
N (about 0^0 or 360^0)		
NE (about 45^0)		
E (about 90^0)		
SE (about 135^0)		
S (about 180^0)		
SW (about 225^0)		
W (about 270^0)		
NW (about 315^0)		

Exercise 2

Rose diagrams are often used in meteorology to plot wind directions and their annual or seasonal frequency. An example from Adelaide airport is given below – note how the wind direction changes dramatically between the summer and winter months.

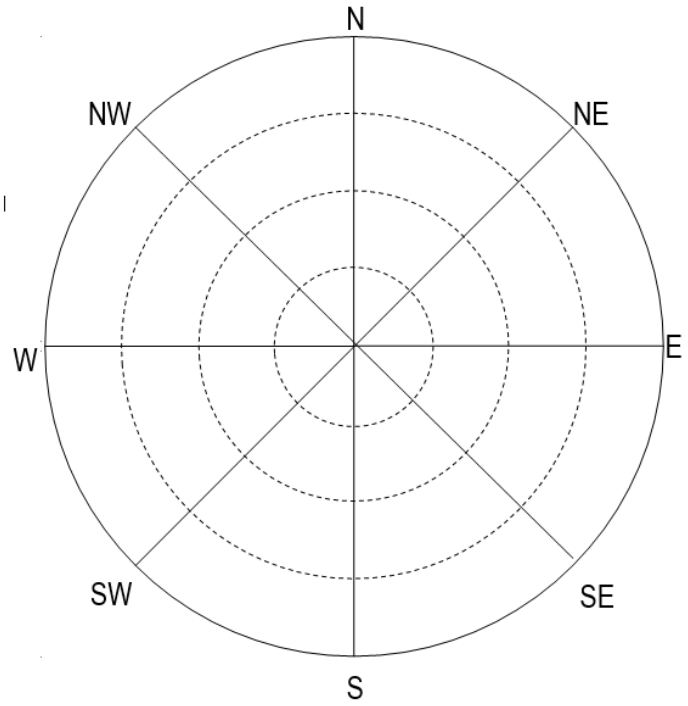


Rose diagrams can also be used in structural geology to display orientation data and the frequency of each subdivision (e.g. N, NE, E, SE etc. as in your table above). We will use a rose diagram to plot the orientation and frequency of joints you have just measured along the northern embankment. Plot the joint orientation data from your table above onto the rose diagram below. As an example, if you had 5 measurements in a N direction, it would look like this:



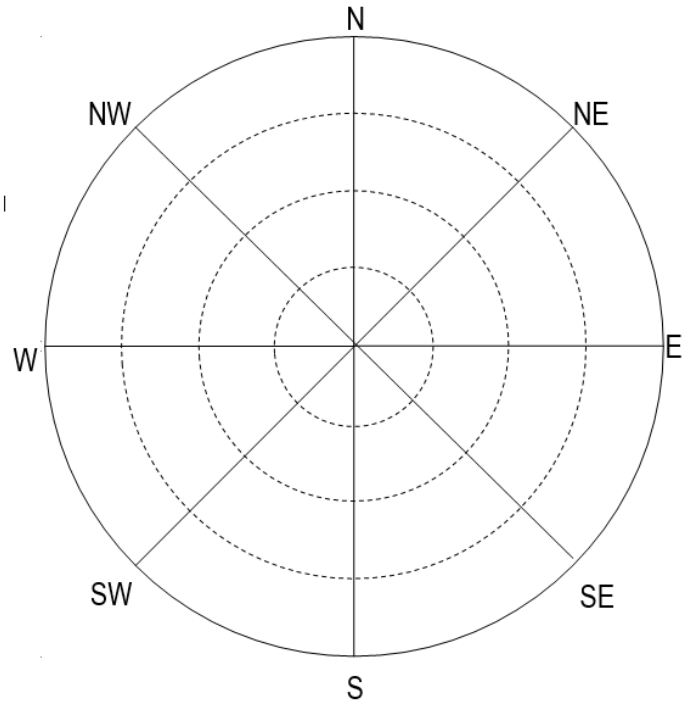
Be sure to label your axes according to the amount of data you have collected.

Rose diagram 1 (northern embankment)



Now create second rose diagram and field sketch using your estimation of the frequency and orientation of joints on the southern embankment, adjacent to the spillway. Note that we will not have access to the rock face – you will need to rely on sighting techniques to estimate the joint orientations and fill in the table below. Compare this plot with your first plot and sketch. How are they similar or different? What features of the northern vs. southern embankment may have affected the dam design and construction?

Rose diagram 2 (southern embankment)



Orientation data from southern embankment

DIP DIRECTION OF JOINT	DESCRIPTION OF JOINT AND NUMBER OF MEASUREMENTS (INDICATE WITH TICKS)	GROUP TOTAL
N (about 0^0 or 360^0)		
NE (about 45^0)		
E (about 90^0)		
SE (about 135^0)		
S (about 180^0)		
SW (about 225^0)		
W (about 270^0)		
NW (about 315^0)		