

REPORT ON LINEAMENT ANALYSIS

CHUKWU CHINYERE PRECIOUS (2021)

Interpretation of analysis:

Lineament is a long linear or gently curving feature on the surface of a terrestrial planet or moon that is suggestive of an underlying geologic structure or contact. Typically, a lineament will appear as a fault-aligned valley, a series of fault or fold-aligned hills, a straight coastline, or indeed a combination of these features. Most lineaments are identified through remote sensing, such as satellite imagery or topographic, gravimetric and magnetic data.

In this task,

- we obtained a slope map (which shows the steepness of the terrain),
- aspect map of 4 and 8 classes (which shows the direction of the slope) was obtained,
- We produced hillshade (a grayscale 3D representation of the surface) to display the terrain in different altitude and azimuth of light. Four best inclination was chosen for this task (315/45, 270/45, 180/60 and 90/60)
- Shaded DEM with lineament map was produced
- Rose diagram, length, count and intersection of lineament map was also produced.

The model used was Digital elevation model (5). While analyzing the slope of the map, we can see that the slopes in the range of 10 to 40 are more predominant while the steepest slope ranges from 60 to 80, more of the lineament are found on the steep slope. . The distribution of more lineament is also related to the substrata lithology or tectonics.

The aspect map shows the direction of the slope. In this task We made aspect map with 4 and 8 classes. 4 classes divided the slope faces into 4 directions which are the North, East, South and west, While the 8 classes divided the slope faces into 8 directions which are North, Northeast, East, southeast, south, southwest, west, Northwest.

My observation from the map shows that the major part of the slope faces the southwestern direction.

Using the shaded DEM with lineament, three different maps were produced .

- The sum of length map showing the grid with the highest and lowest sum of length of lineament represented by the single band pseudo colour symbology
- Count of lineament map which indicates the number of lineament in one grid with the highest and lowest also represented by single band pseudo colour symbology
- Intersection map showing the number of intersections in one grid represented by single band pseudo colour symbology.

From the already produced map, area with higher and lower lineament can be deduced.

The QGIS Line Direction Histogram Plugin creates a rose diagram that can be used to investigate the distribution of the directions of line segments of a line or polygon vector dataset

While rose diagrams are a useful and intuitive way of visualizing the data, they are not on their own sufficient except in cases where preferential orientation is very evident.

From the rose diagram, number of lineament “N” are ($315/45 = 189$, $270/45 = 178$, $180/60 = 274$, $90/60 = 253$). The weighting of length is to the left while no weighting of length is to the right.

From the diagram, the analysis of the dominant line shows that

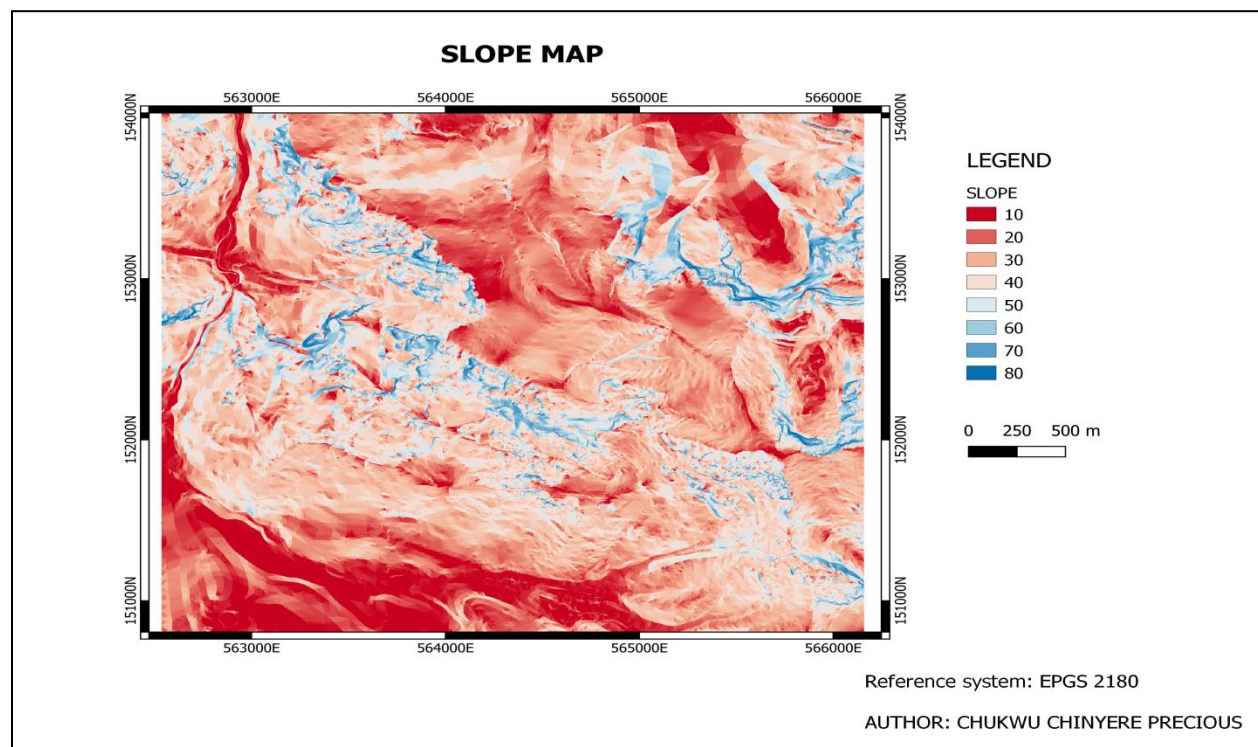
For 315/45 (weighting on length runs from north west to south east direction, no weighting runs from west to east),

For 270/45 (weighting on length runs from northwest to southeast, no weighting runs from northwest to southeast),

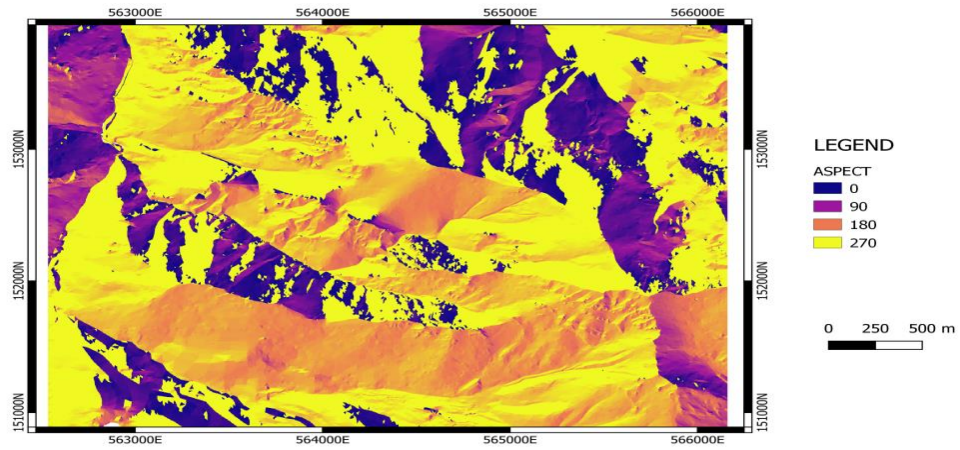
For 180/60 (weighting on length runs from northwest to southeast, no weighting runs from west to east),

For 90/60 (weighting on length runs from northwest to southeast, no weighting runs from northwest to southeast and northeast to southwest).

In general, the diagram shows that distribution of the directions of line segments of lines runs from northwest to southeast.



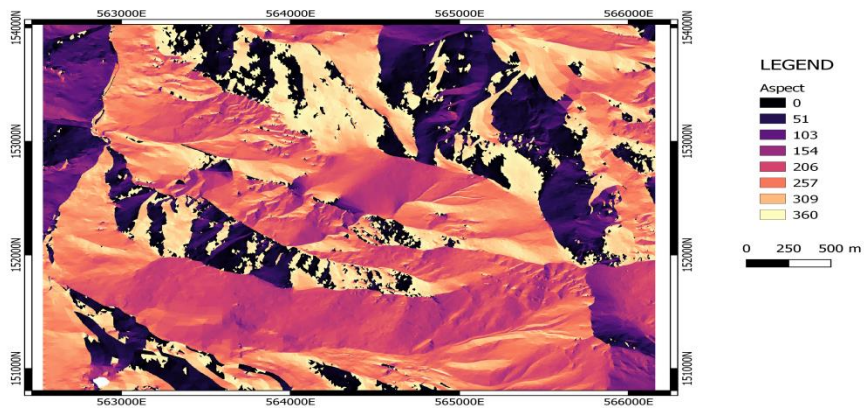
ASPECT MAP 1



Reference system: EPSG 2180

AUTHOR: CHUKWU CHINYERE PRECIOUS

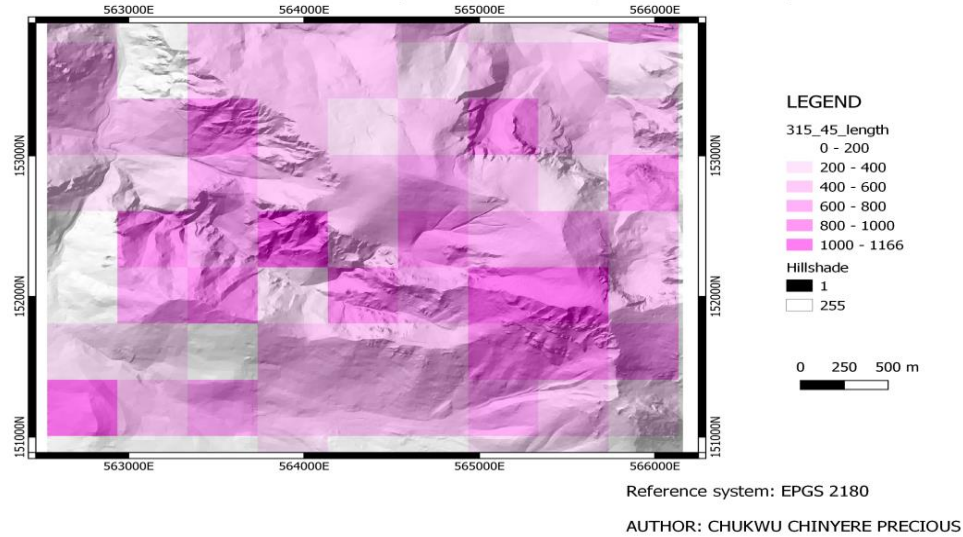
ASPECT MAP 2



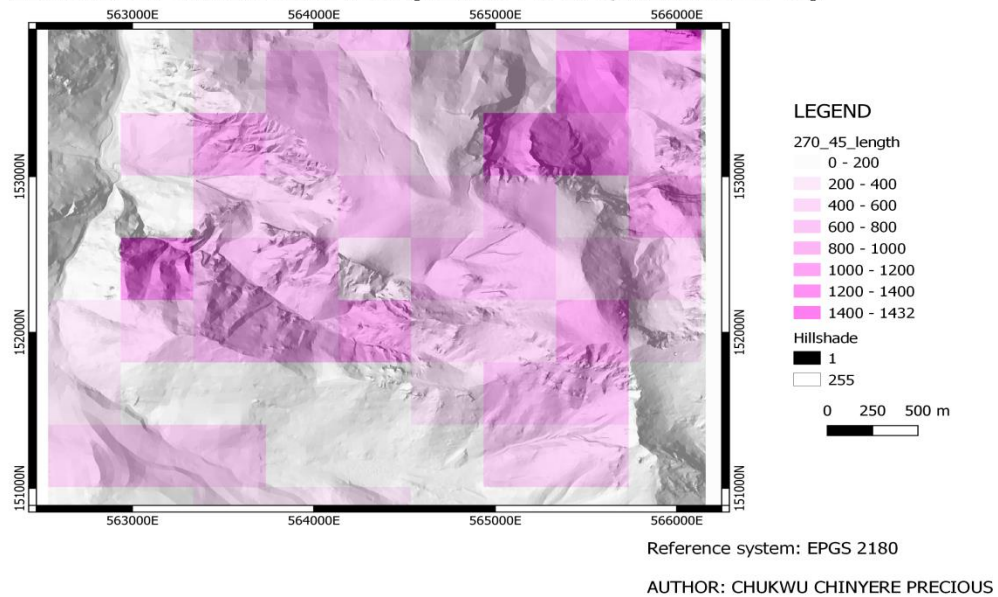
Reference system: EPSG 2180

AUTHOR: CHUKWU CHINYERE PRECIOUS

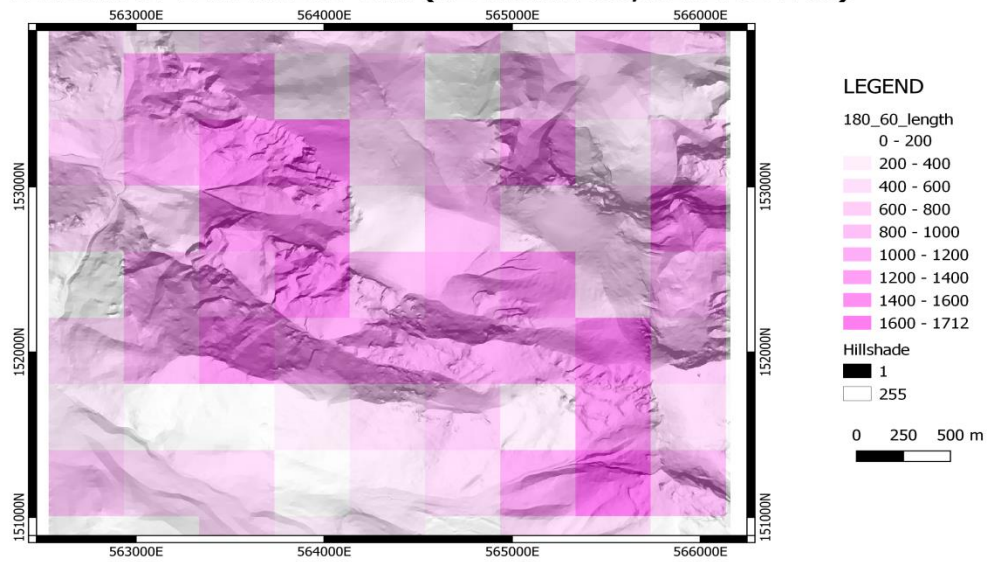
LENGTH OF LINEAMENT MAP(AZIMUTH 315, ALTITUDE 45)



LENGTH OF LINEAMENT MAP(AZIMUTH 270, ALTITUDE 45)



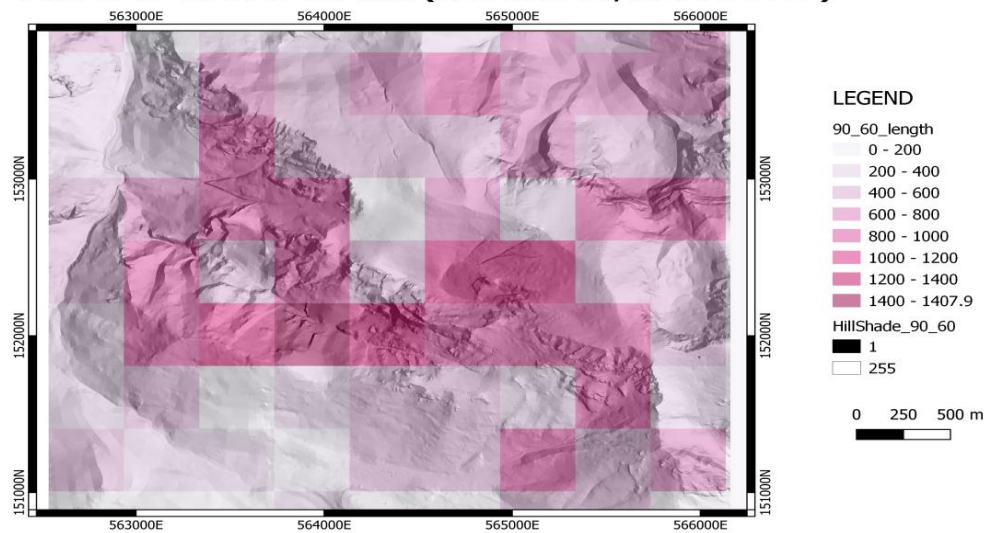
LENGTH OF LINEAMENT MAP(AZIMUTH 180, ALTITUDE 60)



Reference system: EPSG 2180

AUTHOR: CHUKWU CHINYERE PRECIOUS

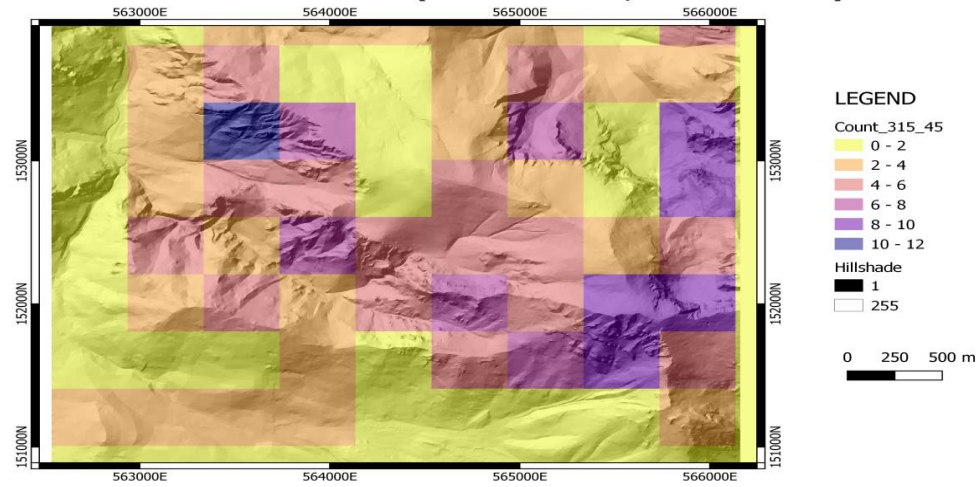
LENGTH OF LINEAMENT MAP(AZIMUTH 90, ALTITUDE 60)



Reference system: EPSG 2180

AUTHOR: CHUKWU CHINYERE PRECIOUS

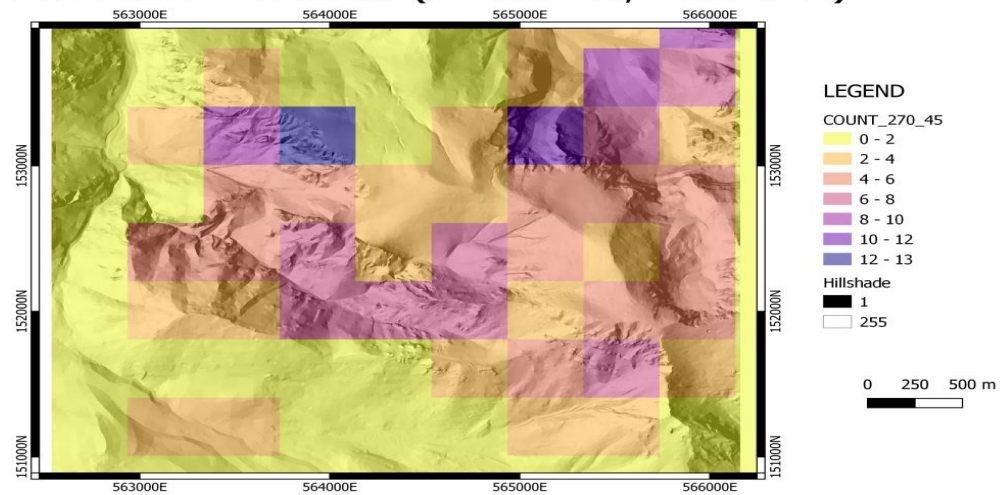
COUNT OF LINEAMENT MAP(AZIMUTH 315, ALTITUDE 45)



Reference system: EPSG 2180

AUTHOR: CHUKWU CHINYERE PRECIOUS

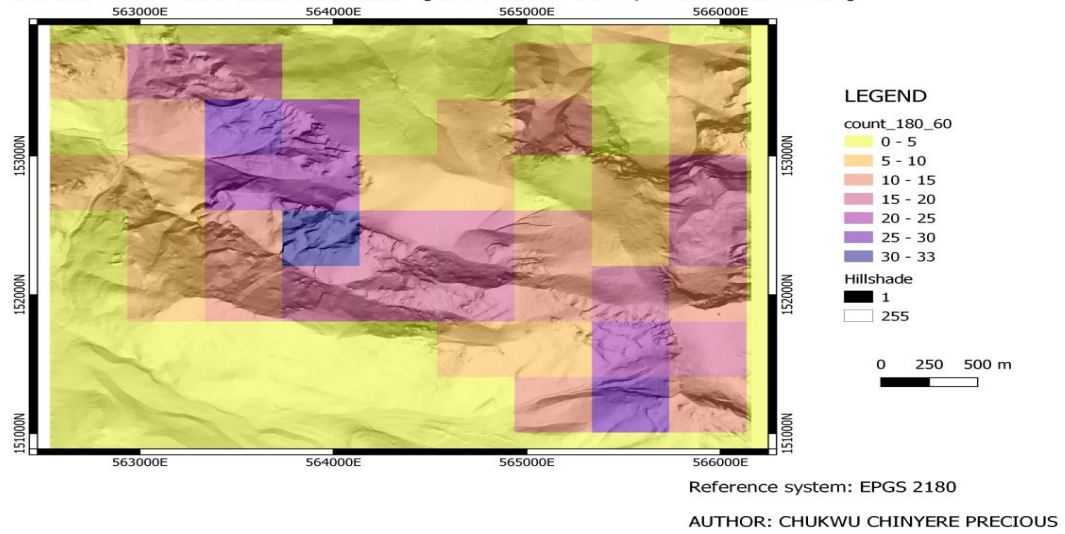
COUNT OF LINEAMENT MAP(AZIMUTH 270, ALTITUDE 45)



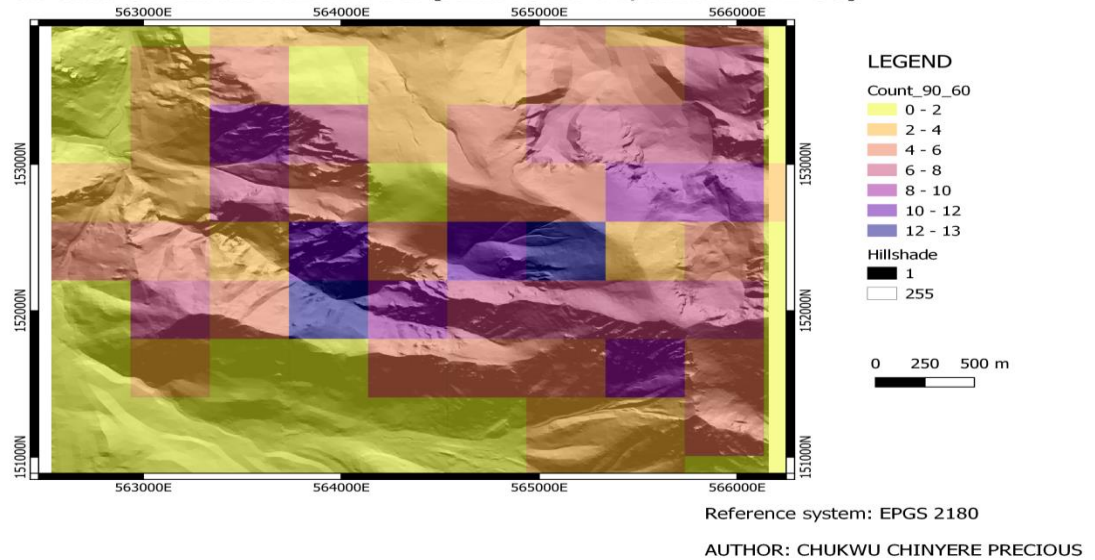
Reference system: EPSG 2180

AUTHOR: CHUKWU CHINYERE PRECIOUS

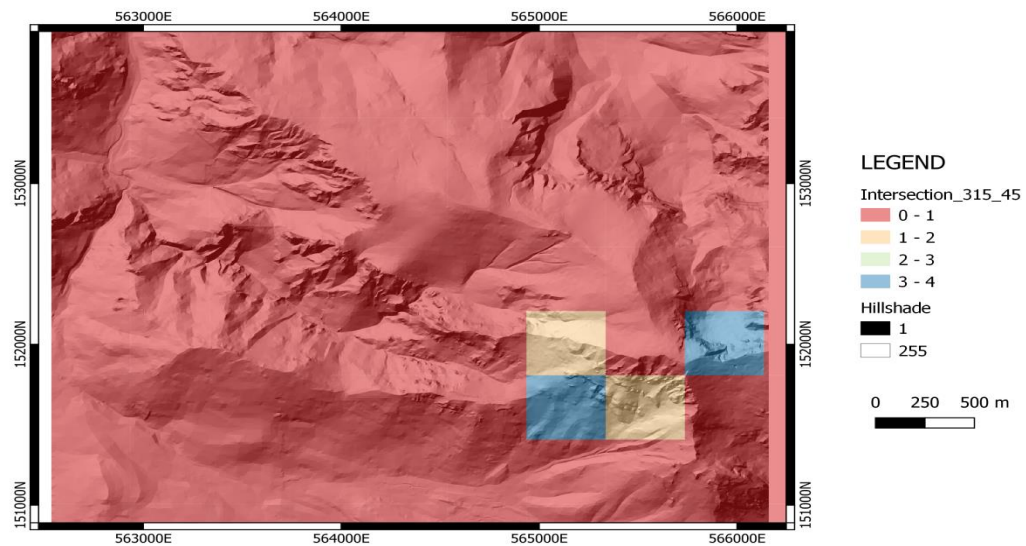
COUNT OF LINEAMENT MAP(AZIMUTH 180, ALTITUDE 60)



COUNT OF LINEAMENT MAP(AZIMUTH 90, ALTITUDE 60)

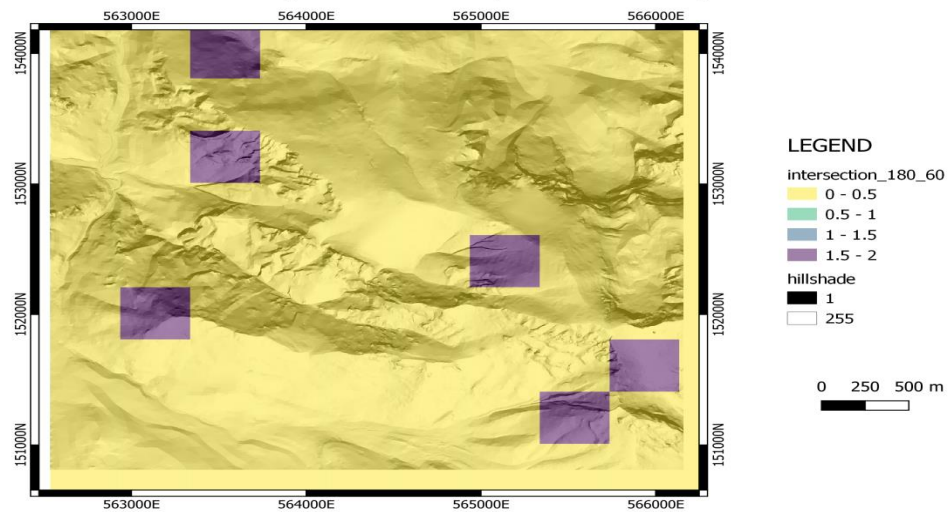


INTERSECTION MAP (AZIMUTH 315, ALTITUDE 45)



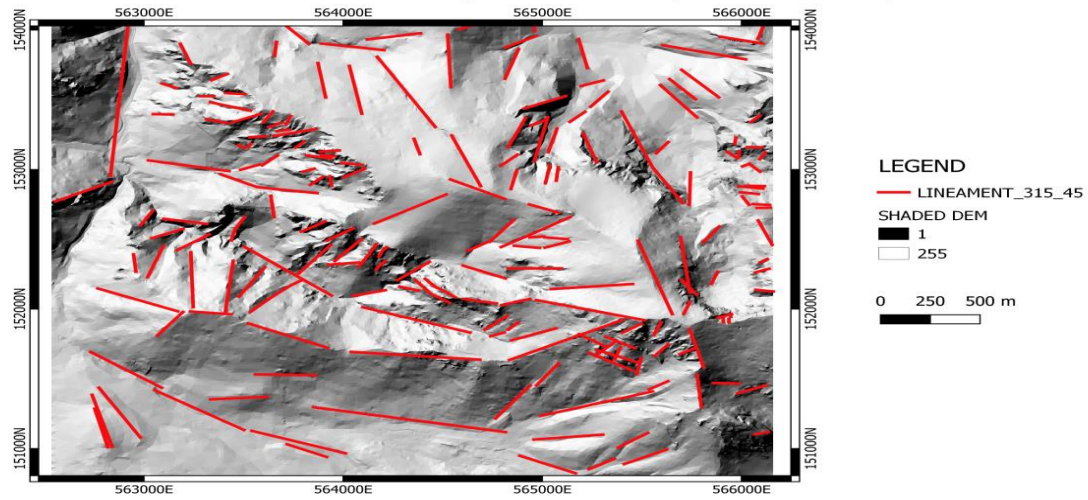
AUTHOR: CHUKWU CHINYERE PRECIOUS

INTERSECTION MAP (AZIMUTH 180, ALTITUDE 60)



AUTHOR: CHUKWU CHINYERE PRECIOUS

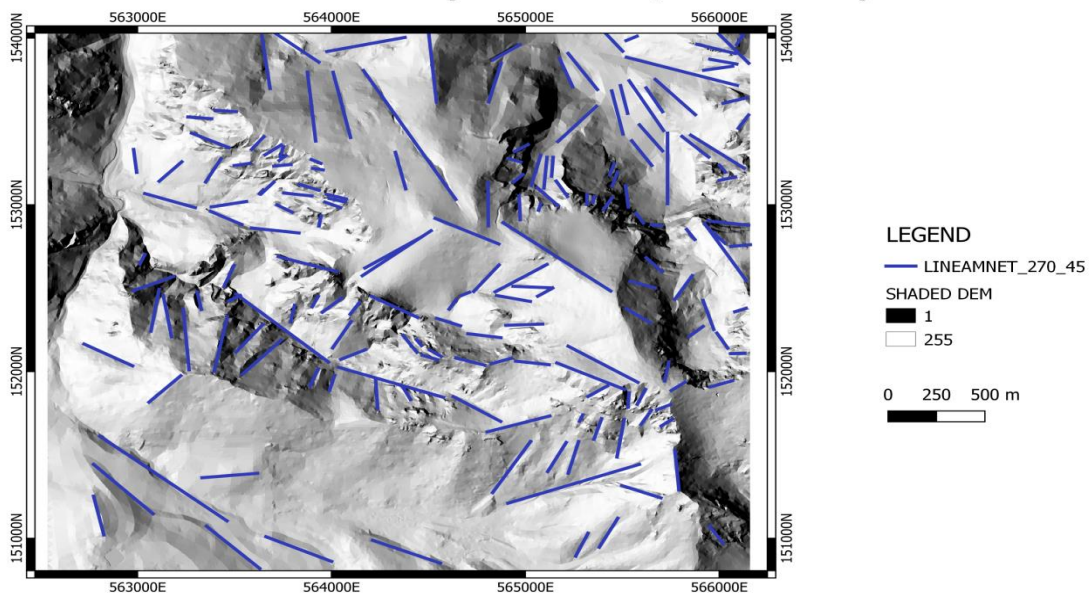
SHADED DEM WITH LINEAMENT (AZIMUTH 315, ALTITUDE 45)



Reference system: EPSG 2180

AUTHOR: CHUKWU CHINYERE PRECIOUS

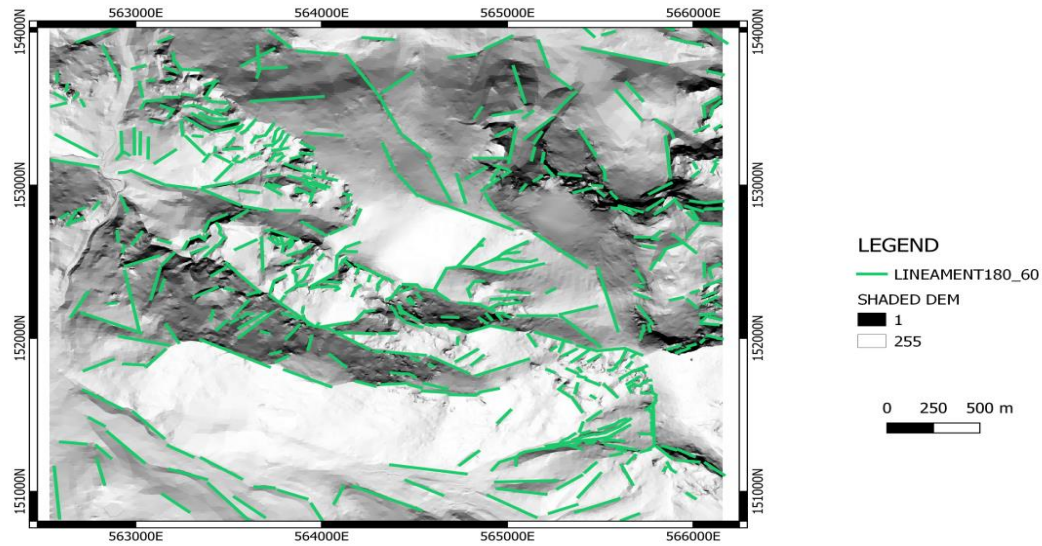
SHADED DEM WITH LINEAMENT (AZIMUTH 270, ALTITUDE 45)



Reference system: EPSG 2180

AUTHOR: CHUKWU CHINYERE PRECIOUS

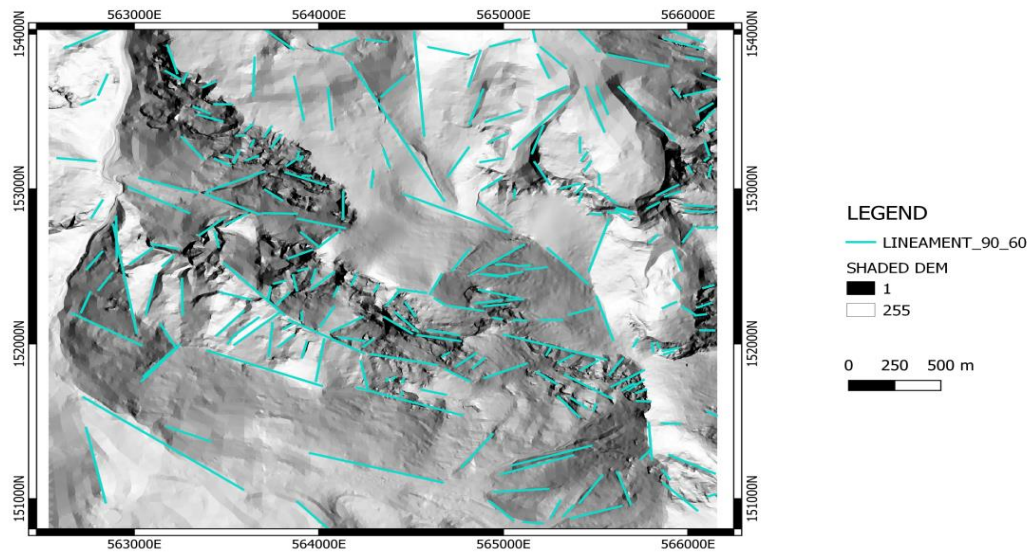
SHADED DEM WITH LINEAMENT (AZIMUTH 180, ALTITUDE 60)



Reference system: EPSG 2180

AUTHOR: CHUKWU CHINYERE PRECIOUS

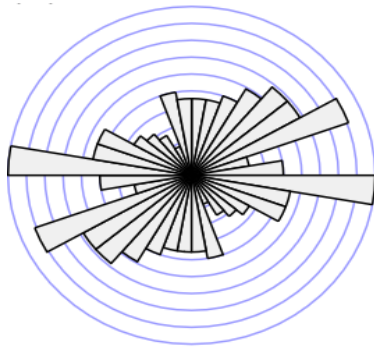
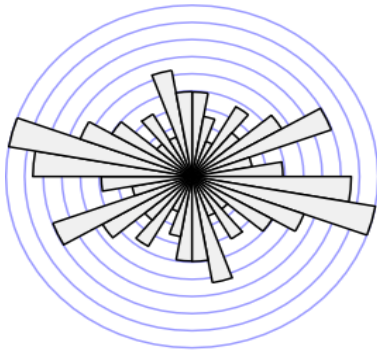
SHADED DEM WITH LINEAMENT (AZIMUTH 90, ALTITUDE 60)



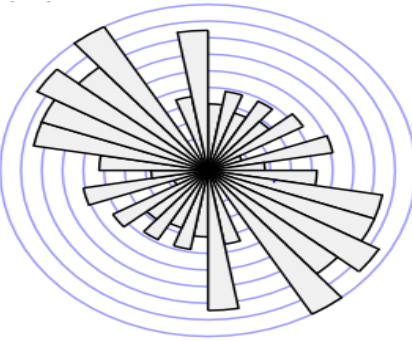
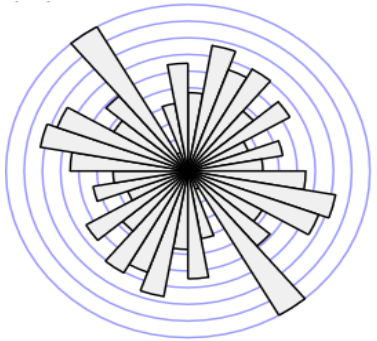
Reference system: EPSG 2180

AUTHOR: CHUKWU CHINYERE PRECIOUS

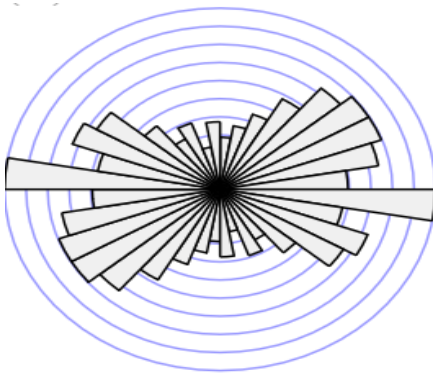
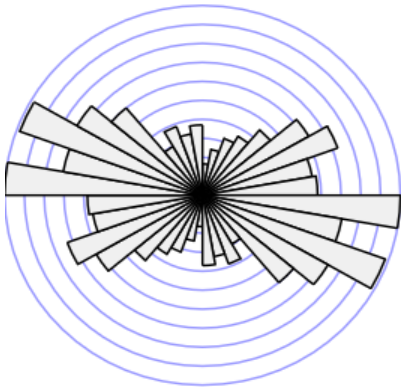
ROSE DIAGRAM



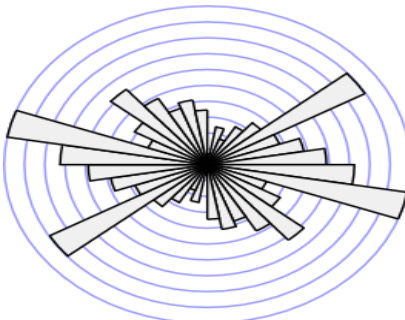
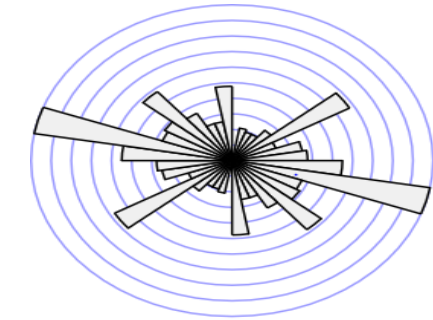
ALTITUDE/AZIMUTH: 315 / 45



ALTITUDE / AZIMUTH: 270 /45



ALTITUDE / AZIMUTH: 180 /60



ALTITUDE / AZIMUTH: 90/60

ROSES ON THE LEFT REPRESENT **WEIGHTING ON LENGTH**,

WHILE THE ROSES ON THE RIGHT REPRESENTS **NO WEIGHTING ON LENGTH**

