SUMMARY AND CONCLUSION

7.1 SUMMARY

The lineaments that criss-cross Peninsular India play an important role as inherent markers of defect for the accumulation and transmission of stress. The understanding of the intra plate seismicity of Peninsular India would be greatly enhanced if we know about the stress sources simulating earthquakes and the pathways of releasing stress in terms of activation of fault or shears. Not only the reactivation of existing shears system or faults, new faults / lineaments are opened up by the incessantly moving plates.

The geophysical and geological results along the Kuppam-Palani transect are interpreted to indicate that a Precambrian crustal block was upthrust onto the Archean Dharwar cratonic block across the Moyar-Bhavani-Mettur shear zone, which is visualized as a late Archaean/Palaeoproterozoic suture (Raith et al., 1999; Chetty et al., 2003). Subsequently the region became part of a large transpressional tectonic zone during the Neoproterozoic, when crustal reworking associated with magmatism and migmatization was localized mainly along the shear zones.

Based on the qualitative analysis of geophysical data Murty et al., (2002) have conjectured that the Pondicherry earthquake on 25 September 2001, might have occurred due to the release of compressional stresses along the fault zone, which may be the offshore extension of E-W trending Moyar-Bhavani-Attur lineament (MBAL). This further indicates the recent reactivation of the Precambrian shear zones in the offshore regions of Tamil Nadu, particularly the MBA lineament.

Hence, the present research study was undertaken in parts of northern Tamil Nadu where frequent recurrence of seismic shocks broadcast the indispensable need to study the Neotectonics. The Neotectonic control in mineralization, water bearing nature, carrying the ions, and causing hazards like landslide, made this study valuable in terms serving the societal need at a
crucial juncture of resource scarcity and struggling amidst the natural hazards.

This study involves the analysis of tectonic, fluvial geomorphic, aeromagnetic, resistivity, and groundwater anomalies; build up a model; validate the model and from the validation evolve methodologies for Neotectonic zonation mapping. Remote Sensing and GIS and the enhanced feasibility of understanding and visualizing the Earth system dynamics, made it possible to undertake the study involving a larger area.

A study region was selected and with the help of satellite data IRS-1A, P24-R60, geomorphological, structural – lineament analysis was carried out and the anomalies were picked up. SRTM data based topographical analysis and drainage analysis were carried out and anomalies from these themes were corroborated with significant lithologies in the study region to select a study window for detailed study.

The presence of steep fracture valleys, steep slopes, fault scarp, combination of dissected and undissected plateaus indicate anomalous characters and the bajada on all the sides of raised plateaus suggest renovation of relative relief and thereby increase in sediment deposition.

The presence of branch off lineaments, parallel lineaments and curvilinear lineaments indicates the area is highly vulnerable for neotectonism. Parallel drainage pattern of Vashista nadi and Swetha nadi and presence of highly sheared rocks also strengthen the fragile tectonic environment in the middle of the study region.

The study window was bounded by north latitudes 11.25° and 12° and east longitudes 78° and 79°. This study window covers an area of 9050 sq.km that includes parts of Salem, Namakkal, Dharmapuri, Villopuram, Cuddalore and Perambalur districts of Tamilnadu state. The Chitteri, Kalrayan and Kolli, Pachchayi sector shows anomalous relief variations with a broad valley in between them which is called as Attur valley.
Satellite based Earth Observation Systems and Geospatial technology in digital mapping, have the credentials of modeling and visualizing the Earth System Dynamics. LISS- III of IRS-IC and IRS-ID satellite data were used for visual interpretation and preparation of thematic maps on ARCGIS 9.0 platform.

The study window was analyzed Geomatically with various thematic maps which were prepared through remote sensing data, geophysical data and collateral data for defining the Neotectonic and Seismotectonic corridors. Further analyses were made to bring out Neotectonic significances in Mineral and Water resource potential, Water quality evaluation and related hazard and Landslide hazard assessment.

SRTM and topographic sheets of SOI based topographic analysis was made to evaluate the topographic anomalies like anomalous relief variation, contour pattern, slope and shape. Profiles were drawn for Shevaroys, Chitteri, Kalrayan, Kolli, Pachchai hills. These anomalous characters were marked as lineaments.

District resource map and field study have revealed significant rock types like mylonites, pseudotachylytes, ultramafic rocks, alkaline rocks, granite and pegmatites, carbonate gneiss and epidote hornblende gneiss which are characteristics of fault, shear zone and rift setting.

Geomorphologic anomalies like triangular facets, alignment of alluvial fans, fracture valleys, intermontanne valley, combination of dissected and undissected plateaus and escarpments were interpreted for Neotectonic lineaments.

Drainage anomalies like radial drainages and annular drainages, parallel drainages, deflected and lineament controlled drainages, eyed drainages and braiding of streams, compressed meanders and palaeochannels are considered to be the active tectonic signatures so, they were specifically located in the study area. While the deflected drainages indicated such probable weak zones predominantly along N – S, NE – SW and NW – SE
alignments, the eyed drainages and other anomalies indicated the predominance of N-S oriented tectonic weak zones with marginal variations from NNE-SSW to NNW-SSE and NE-SW and NW-SE tectonic weak zones. The presence of fracture valleys and structural/ rift valleys in the region suggests N-S lineaments are more active than the lineaments of other orientation.

The trendlines were interrupted or detached by later events otherwise they will have a linearity or curvilinearity attained by much earlier events. So, the breaks and shift in the alignments were traced as lineaments. Similarly structural elements like disturbed folds were also marked as anomalous Neotectonic elements.

Ramsamy and Balaji (1995) have studied the Active tectonics of South India and they came with model indicating NE-SW trending lineaments with sinistral sense and NW-SE with dextral sense were Holocene lineaments and these were resulted due to northerly compression of Indian plate. With this idea and field observation a schematic model was constructed to picturise the lineament pattern and sense of shear in relation to northerly compression.

The various fracture controlled linear features interpreted for the study area using the raw and digitally processed LISS III data of IRS-IC and IRS-ID satellite and from the same Lineament anomalies like Parallel lineaments, Branch off lineaments, Curvilinear lineaments and Lineament Density maxima, Lineaments frequency maxima and Lineament intersection maxima were buffered out.

Aeromagnetic data for this study was obtained from AMSE wing of GSI, Bangalore and Department of Mines and Geology, Government of Tamil Nadu. Using the aeromagnetic total intensity map with the contour interval of 50 gamma, 3D images were prepared for Salem region. Since the aeromagnetic signatures not only indicate structures but also the lithology, wide variation was seen in the pattern of the contours. The distribution of elliptical contour pattern with NE-SW orientation in northeastern part
coincided with Kottapatti shear, southern margin of Shevaroy hills and Kalrayan hills and possibly represented Salem -Attur shear zone (eastern extension of Moyar Bhavani shear). The similar zones of anomalous contour pattern and magnetic breaks, aeromagnetic anomalous domes and basins from 3D images were demarcated as aeromagnetic anomalies excluding Banded Iron Formation (BIF) in Kanjamalai, Godumalai and Malliyakarai (Palaniyapuri) basin. Aeromagnetic profiles were drawn over anomalous zones in order to understand the lateral variations and to provide a terrestrial perspective of the area. Aeromagnetic profile showed clear amplitude variations in accordance with the shear geometry of the terrain.

All these lineament anomalies were integrated using GIS and the probable tectonic weak zones were identified. The analyses of lineaments have indicated that N – S, NNE – SSW, NE – SW, NW – SE and E – W lineaments appear to be probable tectonic weak zones related to Neotectonics. About 99 significant lineaments were mapped and 53 neotectonic lineaments were filtered out based on the coincidence of at least three anomalous parameters / characters detected from various themes.

These Neotectonic map was validated with historic seismic data and seismotectonic nature of the lineaments were deduced. The isoseismal lines drawn from 200 numbers of epicenter data and the 3D GIS images generated and isoseismal maxima were derived. The isoseismal maxima indicated probable neotectonic corridors in N – S, NE – SW and NW – SE directions.

Further validation with the geophysical resistivity data collected for 30m, 50m, 80m 100m and 150m depths from 1300 locations for Salem region. They were analyzed by preparing isoresistivity contours of different depths using SURFER 8 and exported to ARCGIS. From such 3D GIS images the rectilinear resistivity lows and breaks were buffered and correlated with neotectonic lineaments. The same has revealed that the NE – SW, NW – SE and N – S trends indicating probable tectonic weak zones in these directions.
Springs were mapped from topographic sheets and the neotectonic lineament map was overlaid and their alignment with the springs provides the evidences of strike slip faults.

A thorough field work was undertaken at different windows like Kanjamalai, Sarkar Natamangalam, Udayarpatti, Gangavalli, Tiruchengode, etc. so as to identify the ground trace of tectonic grains and evidences for active tectonism. There was greater amount of coincidence of field data for the validation of Neotectonic model where evidences for reactivation were taken into account.

Salem province known for its mineral wealth and many mining industries sprawl around the mineralized zones. Origin of mineral deposits has been attributed to different episodes of earth history but their localization was primarily controlled by rock types and structures. So the mineral map was prepared from DRM and its localization was identified with the help of lineaments. This may help us in two ways, 1) to date the lineaments and 2) to detect the zones of alterations related to metallogeny.

It seems that Bauxite mineralization was completely neotectonically controlled as the hill top topography was defined by these Neotectonic lineaments. Profile pattern study was made to analyze the relief control and the neotectonic lineament connections.

Other important loci of mineral deposits are rocks. So important mineral bearing rocks, such as ultramafic rocks, granites and pegmatites, alkaline rocks were targeted and the alignment of lineaments along these rocks symbolizes the reactivation of faults as these rocks are restricted to rift setting. Moreover alteration of dunite into magnesite by hot ascending hydrothermal fluids and alteration of pyroxenites into steatites are very common in the study window.

Dykes either get terminated or dislocated along these Neotectonic lineaments. Carbonatites emplacement also shattered the dykes near Umayalpurampudur.
Researchers like Aiyengar (1948), Gopala Rao (1966) Venkatesan (1967) and Shrivastava and Saleem Ahmed Khan (1982) have done some exploration in these places for gold occurrences. Moreover, Attur valley area provided an ideal setting for emplacement of ultramafic bodies, alkaline syenite and carbonatites since it lies in a region bounded by Pakkanadu - Mulakkadu alkaline suite and Chalk hills ultramafics which are aligning with NE-SW and E-W lineaments. Similar lineament could be traced within Attur valley with NE-SW trend and also with E-W traversing lineaments cutting across alkaline rocks could be expected.

Digital image processing generated false color composite bands 7, 4 and 2, principle components and ratioing (bands 5/7, 5/1 and band 4, and bands 5/7, 4/5, 3/1) in RGB were used to map the altered zone and found to be very useful in demarcating the carbonate metasomatic zone in Attur valley. Field based study in Eswaramoorthipalayam area has revealed existence of ultramafic-alkaline rocks like dunite, syenite, lamprophyre and carbonatites and plenty of quartz veins around the these suite of rocks. Since it provides the ideal setting for the gold mineralization, the possibility of the extent of mineralization could be demarcated upto the extent of carbonate gneisses. The lineaments passing through the mineralized zone could be activated and reactivated earlier to bring the alkaline rocks and the shattering of alkaline rocks implies that the onset of carbonate metasomatism was much later event.

Ultramafic rocks are the host for several different metal ores and industrial minerals. Magmatic minerals include chromite, and Fe, Ni, and Cu sulphides, sometimes with Co. Ultramafic complexes are also the major economic source of platinum group element (PGE) minerals. So ultramafic rocks were mapped and dislocations and alignment of these rocks along Neotectonic lineaments were also observed. A newer body of ultramafic rocks was reported near 1008 Shiva temple, Chinnasiragapadi and extensions of peridotites were mapped during the field study near Siddhar kovil. Base metal mineralization was observed in Mamandur and aligning along a NE-SW trending lineaments.
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Geoinformatic Modelling for Certain Georesources and Geohazards of Attur Valley, Tamil Nadu, India.
mineral sources makes the water unsuitable for drinking and also hazardous in sense of causing many diseases to the consumers.

So, the water quality of this terrain was analysed spatially with the permissible limits based on IS 10500 - 1991 and the loci of anomalous concentrations were highlighted.

Water quality index was estimated for each of the samples of both the seasons of 2007 and spatially displayed. The result found to be fit for human consumption and quality varies from Excellent to Good in all the areas in 2007.

Piper’s diagram clearly explains the variations or domination of cation and anion concentrations during premonsoon and post-monsoon. Ca-Mg-type of water predominated during pre-monsoon. The percentage of samples falling under Ca-Mg-type was 60.87 % during premonsoon season. Similar type of water is predominated during post-monsoon also with 57.97 % water samples. For anion concentration, HCO$_3$-type of water predominated during pre-monsoon with 36 % samples and during postmonsoon with 32 % samples. There is no significant change in the hydro-chemical facies noticed during the study period (pre- and post-monsoon), which indicates that most of the major ions are natural in origin.

In premonsoon season, the factor one explains 47% followed by 13%, for the second factor, 9% for third factor and 8% for the fourth factor. Factor one is made up of TDS, EC, Mg, Na, Ca, Cl, SO$_4$, and NO$_3$ which indicates secondary leaching and evapo-transpiration and eventually corresponds to the dry season which enhances the concentration of salts in water. The factor two is made up of CO$_3$ and pH which is representing the direct relation between alkalinity and its carbonate content. Factor three is made up of HCO$_3$ and F which indicates positive relationship between fluoride and HCO$_3$- is observed in shallow aquifers (Sarala Shirsat, 2011). The fourth factor with 8% variance was positive loading with F, CO$_3$, Ca, Mg, and TH while negatively loaded with Na, K and HCO$_3$. The significance of positive
loading of Ca, Mg and CO$_3$ with F is weathering and leaching of these elements from natural source that is either carbonates or Ca and Mg bearing silicates.

Fluorosis is one of the diseases caused by high fluorine content in water above the permissible limit [1ppm as per World Health Organisation (WHO) standard]. Fluorosis is a disease which directly affects the human teeth and bones and makes them brittle and weak. This area is spotted with granites, pegmatites and migmatites which are the major causative source rocks for the release of fluorine in water. The areal spread of fluorine must be controlled by the lineaments and hence a spatial relationship study was done for fluorine data from 1998-2009 for both the seasons. The Neotectonic lineaments were fairly contaminating other area which is free of fluorine source minerals.

The study area is bounded by many hills and hillocks, to name a few Shevaroy, Chitteri and Kalrayan in the north and Kolli and Pachchai hills in the south, many hillocks like Kanjamalai, Godumalai, Bodamalai, Nainar malai and Paittir hills at the centre of the study area. Since the landslide is a phenomenon happening in high relief region, hill boundary map was prepared and the necessary thematic maps like geology, geomorphology, landuse, structure and lineaments and slope were generated for hilly part of the study area.

Higher weightages were given to the causative parameters in each theme as suggested by Ramasamy et al. (2008). The thematic maps were integrated by index overlay method and landslide hazard zonation map was prepared. The resultant map was overlaid on active lineaments detected earlier. Field check was made in part of study area viz. Shevaroy hills and Kalrayeran hills to validate the map. The study showed that the active lineaments have significantly contributed to the landslides. The lineament characterization was restricted to the locations where landslides occurrence were verified in the field.
Thus, the present study has led into identifying the zones of Neotectonics by means of combinations of visual interpretation of satellite images, geophysical methods and thorough field study. Structural features, demarcation of geomorphic, geologic, drainage anomalies have provided the impetus to map tectonic framework along with the neotectonic zones. This has provided a solid base for further mapping the seismic vulnerability of the region. In addition, the present study has also thrown light on some newer ideas in understanding the status of environment on a geologic perspective.

Having understood the tectonic framework, evaluating the nexus between mineral wealth and water potential and the tectonic setup of the region has thrown light on identifying new mineral deposits and water potential zones and controls. Further, the present study has brought out the geoenvironmental sabotages such as landslides and water borne hazards like fluorosis which may have immediate and direct effects over the sustainable development of this region and also which are contributed by the lineaments.

The understanding of the plate interior seismicity of Peninsular India would be greatly enhanced if we know about the stress sources triggering the earthquakes. The stress regime analysis computed from the interpretation of focal mechanism of a large number of earthquakes, indicates operation of a NE-SW-directed compressive stress system over the entire Indian Shield. Such a homogeneous, unidirectional stress cannot result from any of the above-mentioned processes, which might be responsible for influencing local stress pattern marginally. The only geological process that can generate such a stress system over the entire Indian Shield is the formation of a new crust along the NW-SE-oriented Carlsberg Ridge– rift system operating in the Arabian Sea of the Indian Ocean (Roy, 2006).

Thus, these tectonic features indicate that the Indian plate is still under the grip of northerly directed compressive force related to the original force drifted the Indian plate towards northerly and causing such post collision tectonic features. The integration of earthquake epicenters with these faults
deduced from drainage anomalies too indicate that most of the moderate to low seismicities reported so far in this region fall along them (Ramasamy et al., 2011). Such an architecture of active tectonic grains indicates that the northerly directed compressive force which has originally drifted the Indian plate towards northerly, is still active and deforming the Indian plate.

7.2 CONCLUSION

Based on the remote sensing and geoinformatics studies on neotectonism, natural resources and certain natural hazards of Attur valley drew certain conclusive observations.

- This area is a unique by its topographic, geomorphologic structural and geological set up.
- Neotectonic signatures are manifested in the anomalous characters of topography, geomorphology, drainage pattern, significant lithology, structures and lineaments, total magnetic intensity.
- The possible tectonic model has been developed for the Attur valley with the E-W thrusting towards north, N-S open fractures NE-SW and NW-SE wrench faults.
- Historical seismic records propagates the message of active tectonism in part of country and forms the best validating tool for the remote sensing and geoinformatic based modelling of neotectonism.
- Historic seismicities data and thereby Seismo-tectonic lineaments were identified. 40 out of 53 Neotectonic lineaments are significantly seismogenic in characters and they align with the epicenter of recent earthquakes.
- The alignment of springs indicates a fault and it could be used for the validation and characterisation of the lineaments.
- Multi-depth resistivity data provides better understanding of the penetrative nature of lineaments.
Remote sensing is the best tool to observe neotectonism because of its large areal coverage and perspective view of the terrain.

Field study was made at selective windows and evidences of reactivation in terms reversal of shear sense and microfaulting of sheared rocks and related changes were observed.

Field study was very essential in establishing the reactivation of lineaments in this region based on superimposed structures. The disturbances later to Sankagiri granite emplacement (Pan-African) were recorded in all the field study windows.

N-S trending lineaments are acting as stress releaser and they may be the tear faults resulting from the thrust related to arching of this part of region.

The E-W trend seems very significant and this region possess some associated structures like folds, thrust faults, tensional fractures, pull-apart basin or rhomb shaped grabens (Sag ponds) and riedal shears (subsidiary shears) and hence they may be attributed to transpression related to crustal shortening. And the dominance of E-W trending seismogenic and neotectonic lineaments confirms the same.

Though no new mineral deposits were formed after at least late proterozoic in the study area except younger alluvial deposits, the impact of recent tectonism or reactivated tectonism played a vital role in bringing alteration in the parent rocks and produced mineral like steatite, asbestos and magnesite and also dispersing the rock types hosting the mineral deposits.

Moreover, the alkaline magmatism in the study area has brought out the probable gold mineralization in Attur valley.

The bauxite cappings were restricted to high peaks which were in turn formed due to tectono-geomorphic events probably the block faultings.
The Neotectonic lineaments are dispersing and dislocating the rocks like dykes and Ultramafics.

Water potential zones were identified for the entire study area by rank and weightage method of 9 terrain parameters.

The lineaments intersection zones found to be highly water potential and the same was found in the study. The shear zone with weathered ultramafics and fissile hornblende gneiss seems to be very good aquifers. The region like Salem has very unique lithology and they have higher secondary porosity owing to intense shearing. Prime weightage was assigned to lithology and proved to be correct with resistivity and aquifer parameters by pump test. The water level stable zones were also found along the shear zones and lineament intersection areas.

From the analysis of the water level valleys for 19 years from 1990 to 2008, we could observe that certain parts of the region have permanent water level stable zones near Belur, Tirumanimuthar stream course south of Salem, Rasipuram-Metala segment, Kallakurichi – Chinna Salem - Thalaivasal segment, Thammampatti zone, Puthansandhai-west of Kolli hill zone, Attur-Gangavalli zone, Thoppal Ar zone and Omalur-Kadayampatti zone. These zones have at least small valleys throughout both seasons of 19 years.

The E-W lineaments have control over valleys seen at the foot of Shevaroys to Kalrayan, but seem to have a flow barrier at the middle of the Salem-Attur segment, especially near Vazhapadi-Malliyakkarakai segment. This area is a topographic as well as a lithologic barrier. Moreover the general foliation trend takes a northerly swerve near Godumalai but for the shear zones and E-W trending lineaments the flow control would not have occurred towards the east at heavy rainy season.
This area is covered with numerous dykes, mafic granulites and banded magnetite quartzite bands, these rocks serve as walls in damming the flow of water despite dissected by many lineaments. This area is also known for its carbonatites and carbonate gneiss occurrences, and hence there is valid reason to believe the leachates from carbonates form kankars and heals the primary and secondary porosities of the rocks. At seasons of heavy rainfall (2002 & 2006) the barriers have been breached and broad valleys could be seen (4.21e & 4.23b).

The NE-SW lineaments NL48, NL51, NL36 and NL19 running throw the Chitteri hills have great control over water level stabilization. E-W trending NL1, NL6, NL23 and NL25 have similar control and even they were penetrative through the northeasterly trending foliated rocks. Similar penetrative trend was observed along Swetha nadi fault lineament NL42. The lineaments NL10 and NL13 have the flow control along NW-SE directions in Thumbal-Gangavalli sector. Apart from this N-S trending NL4, NL21 and NL47 lineaments have the control over the flow in Chitteri to Vazhapadi sector. Significant lineaments do also have the control in the ground water flow especially L60, L68, L91 and L97 have control in the Kalrayan eastern segment. N-S trending NL17, NL18, L58 and L72 have seems to carry water from high rain fed Kalrayan hills to Gangavalli zone and further south. The NE-SW trending lineaments control the flow from Belur -Vazhapadi segment to South of Salem region. NW-SE carries water from the Chitteri and Kalrayan catchment to Gangavalli zone.

The concentrations of cations and anions are mainly controlled by lithology of this region and partly by the lineaments which acts as pathways.

The water quality index was estimated and their spatial distribution implies excellent to good quality of water for the year 2007.
Piper diagram signifies the natural origin of most of major ions as there is no significant change in the hydro-chemical facies noticed during the study period (pre- and post-monsoon).

Factor analysis of the pre monsoon and post monsoon data of 14 variables indicates nearly 77% and 74% respectively of the total variability accounted by the four factors which are having Eigen value greater than one.

Hazard Zonation mapping was done for Fluorine ions for both the seasons of period from 1998 to 2009. The values above the desirable limit of 1ppm were taken as the critical value for marking the hazardous zones. The fluctuation of the spatial distribution was observed along Manjavadi Ghats - Sukampatti sector, Toppur - Omalur sector, Eswaramoorthipalaym sector, Vazhapadi sector, Eastern Kalrayan sector and Gangavalli sectors.

The presence of fluoride and the dominant control of E-W trending MBSASZ may be due to the presence of carbonatites along these shear zone. Migmatites are the Causative source of fluoride in Manjavadi - Sukampatti sector and Syenites, Granites and pegmatites, may be the source rocks for Omalur, Taramangalam, and Toppur area. Carbonate gneisses and carbonatites are source rocks at Eswaramoorthipalaym area.

This study revealed that 35 significant lineaments have apparent control over the mobility of fluoride ion out of which 30 are neotectonic lineaments.

Gangavalli shear with pseudotachylytes and Cataclasites serve as barrier for the migration of ions and hence concentrations are higher near Gangavalli on the eastern side and Paithur on the western side of NE-SW trending ridge.

A comparison study was made with the spatial distribution of fluorine ions with the neotectonic lineaments. The E-W, NE-SW and N-S trending lineaments show significant alignment with the fluctuation.
trend of fluorine spatial trends. The NW-SE trending lineaments were not of significant in carrying the fluorine ions as except along Attur segment and, Sarkar Natamangalam and Vazhapadi segment.

- Index overlay method is an effective method in mapping a large area where previous records of landslides are not available or the terrain is inaccessible. Seven system parameters were used for the geomatics based raster analysis and led to the identification of landslide prone zones which were further validated with field study. The lineament characterization was restricted to the locations where landslides occurrence were verified.

- Undoubtedly, the lineaments with N-S orientation have cut the general trend of NE-SW foliation and NE-SW trending lineaments in acute angle and make the rocks unstable to hang on the slope. The alignment of slump scar along N-S lineaments suggests sinking of land mass or probably widening along east west direction corresponding to the arching and consequent subsidence alternatively of the region owing to adjustment tectonics in the south India in response to collision with Asia.

- Collectively, this study has emphasized the input of tectonism coupled with geospatial technology on the geoenvironmental sustenance of the study window, especially natural resources and natural hazards.

This study has opened up many windows and recorded many features. After narrowing down the active lineaments of Attur valley and their implications, high resolution satellite data and hyper spectral data based study could pour more details and hence micro-zone level study can be done. The characterization of lineaments would be a good source of information for the planners and the administrators. Further a detail study can be under taken for Gold mineralization in Attur valley.

The characteristics of the Neotectonic lineaments in terms of Resources and Hazards control were listed in the **Annexure-IV**.