VLF Remote Sensing Measurements of the Lower Ionosphere at Site of the UAE

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- The Stanford VLF group, is engaged in studies of electromagnetic phenomenon in the ionosphere and magnetosphere. Among the chief methods employed for these studies is the placement of receiver systems tuned for the ELF and VLF frequency ranges (30Hz-50kHz).

- VLF is the most useful way to engage in studies of the ionospheric D-region. Traditional methods such as radar scatter, ionosonde, etc, have been unable to produce many results on the nature of the D-region due to the relatively small electron count. VLF waves, however, reflect very efficiently from the D-region, and thus are an excellent medium for study.
The network would enhance the ability for ionospheric imaging over Europe, and would begin to provide a picture of the nature of thunderstorms over Asia, and even central Africa.

The proposed project would include established a new site for monitoring such phenomena at Sharjah (UAE) with the collaboration and technical support of the VLF group of SU.

The prime objective of the current studies is to provide a basic data for quantitative comparison of lightning-induced disturbances of the ionosphere and the radiation belts in the American, European and Asia sectors. Most of the current data on such phenomena has so far been obtained in the western hemisphere, and the weight of scientific information indicates that lightning-induced effects at high altitudes and in the radiation belts may dominate other processes on a global scale.
The ongoing research supported by UoS and the fund is been used to establish station to monitor and observed VLF at UAE as a part of the Asia sector, thus providing a basis data for comparison to facilitate global extrapolations and conclusions. Under the current research project, SU partners with UoS is already deployed one of their VLF receivers at UoS campus.
UoS research team just start to monitor, collect and store the data follow the well established methodology adopted by the research team of SU. These data, throughout of the collaborative program between the two universities, can be available for analysis with research team of SU.

On the other hand the significance of the ingoing measurement and collected data would be highlights by provide a clear picture of the nature of thunderstorms over middle east which in turn will assess to use information from the ionosphere and magnetosphere to measure phenomena such as whistlers, electron precipitation, solar flares, sudden ionosphere disturbances, gravity waves, sprites, and cosmic gamma-ray flares. This makes the Sharajah AWESOME receiver the first of its kind in the region for mapping the ionospheric imaging over Arabian Peninsula.
The Sharjah AWESOME receiver Station just been deployed in the coastal city of Sharjah; the capital of the Emirate of Sharjah, United Arab Emirates (UAE). The city is strategically located in the northern part of the UAE on the coast of the Arabian Gulf. It is located at the eastern side of the Arabian Peninsula,
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The installation of the station: The Block Network of the system for mentoring, collecting and storing the data at the campus of Sharjah University is shown in figure below.
These data shows very clear the collection of various spikes of thunderstorms which give us a very good evidences that the new sharjah site for recording the VLF signals is very good and will provide available data information for the first time over this region.

These data, throughout of the collaborative program between the two universities, will be available for analysis with Research team of Stanford university.

This will provide scientists involved in the project access to data from other stations around the world to monitor and observe, at the UAE as a part of the Asia sector, thus providing a basis for data comparison and to facilitate global collaboration with renowned scientists in the field and research groups.
Collaboration

- possible collaborations with local agencies and authorities
- possible research projects at the Applied Physics Dept (support graduate program)
- possible outreach and community service programs (high schools)
- possible international collaboration (Stanford, Azerbaijan............)


Thank you