

Remotely sensed lineaments and analysis of water-feeding mechanisms in fractured coastal land, Lebanon-eastern Mediterranean

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Water shortage in the Middle East is a normal aspect. But an expected annual water shortage anywhere between 200-800 m.c.m. within ten years specially in Lebanon, a country that is supposedly self sufficient, is not normal. This led concerned authorities to spend efforts looking for unconventional sources. The study is one using advanced techniques, i.e. remote sensing, to delineate the coastal (on-land) fracture-lineament system acting as a feeder for several fresh-water springs within the sea. The latter were detected by air-borne thermal infra-red (TIR) scanning. The coastal area is the most stressed in terms of resources and population density.

Depending on temperature differential, TIR imagery detected 35 anomalies in the northern half of the coast. These include fresh-water and land-borne waste-water. Optical satellite imagery on land, Landsat and SPOT, discriminate land use and reveal a fracture pattern. There are oriented lineaments that seem to enhance preferential flow direction. The major fractures, almost orthogonal to the coast-line, are more crucial than others. As the regime is influenced by karstic nature, it makes interpretation more difficult. The interactive display between major fractures, lineament sets and karst, plus the rate of recharge and salt water intrusion, are natural controls. Disrupting this system, however, is man's imposition through drilling wells plus possible blockage of subsurface channels.