

Interactive comment on “Satellite data interpretation of causes and controls on groundwater-seawater flow directions, Merseyside, UK: implications for assessing saline intrusions” by S. Mukherjee et al.

Anonymous Referee #2

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The article addresses how structural control by faults etc. influences water quality in an aquifer, in this case the intrusion of seawater. Structural control of water flow is a very valid subject. I work on it myself mainly using highly resolving geomagnetic surveys in southern Africa.

Everything written in the text sounds reasonable and well thought through. The expectations from remote sensing are based on correctly quoted literature. Still I have my problems with this article.

I can just not see in the images what the authors see. Sorry for that. In the zones of faults a black bar in the pictures indicating the fault does not even allow me to follow on

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a purely visual basis the observations of the authors i.e. make out any discontinuities.

Using remote sensing data a lot myself I struggle with the question of how to use these data in an objective way. For me the article is an example of the way one should not go about using remote sensing. Looking for some “red spots” is not an objective way of analyzing an image. I miss the proof of the existence of anomalies in a numerical and quantitative sense. There is a lot of scatter in the data which could also be brought into connection with geological features. The authors are however selective to see things only where the geological map has already shown them that faults exist. The distinction of sand and clay area is performed in a number of sampling points. One might get the impression that these are ground truth data from which the correlation of the hyperspectral ratio could be confirmed with ground truth. But this is not so. Only image data are manipulated never to be compared with ground truth. This is another fallacy in the application of remote sensing data. When agencies offer their products and easy to use software they never tell that the real effort lies in obtaining ground truth.

The major conclusions on compartmentalization are done not on the basis of remotely sensed data but on the basis of a large localized hydraulic gradient and observed salinity data. The contribution of remote sensing to the conclusions is marginal (even if one can see what the authors see).

If no quantitative proof including statistics is given for the existence of the features observed in the satellite images by the authors I feel that this article cannot be published.

When submitting this report I just noticed that there is another article on the discussion rooster on the same aquifer and geochemical interpretations. Why not put the two things together? It seems anyway that the geochemistry is much more conclusive than the remote sensing.

I suggest rejection of the article as it stands and recommend resubmission if the features can be made plausible in a quantitative way. I also recommend combination with

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Interactive comment on Hydrology and Earth System Sciences Discussions, 2, 887, 2005.

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