

**GROUDWATER FLOW THROUGH FAULTS-FRACTURES SYSTEMS: AN
ALTERNATIVE WATER SUPPLY FOR OAXACA'S COASTAL AREA.**

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ABSTRACT

Fresh water demand in Oaxaca coastal area poses a severe problem from both the geological, geochemical and logistical points of view. Drilling of wells in this area is not longer a suitable way of groundwater extraction to satisfy the ever increasing need for fresh water.

One common problem is saline water intrusion associated with an irrational over exploitation of aquifers. On the other hand, alternative water bodies such as lagoons are extremely salty and polluted. Most soils are characterized by high sodium content and this severely affects the quality of water recharging aquifers. There exist an alluvium belt, but it is too narrow and thin as to be considered an important source of water supply.

The above mentioned problems represent an extremely complicated challenge to both geoscientists and civil planners.

In order to search for a rational solution, we analysed the possibility that faults and/or fractures could be way paths for ground water to the surface. We carried out an integral research project that included both hydrological and geophysical techniques.

Apart from geochemical analysis we employed geoelectrical tomography to investigate the geological structure beneath faults and fractures identified in the ground by cartographic techniques. From an analysis of the resistivity values we were able to identify potential aquifers in eight spots at San Pedro Pochutla county and Puerto Escondido resort. To confirm our findings, we apply the same procedure in areas with known wells under exploitation and found an excellent agreement in both the location of the aquifer and even a nice match between geochemical data such as electrical conductivity and true resistivity values obtained by ERT (Electrical Resistivity Tomography).

While these results are very promising, it is quite clear that we are facing a severe problem in this coastal area. Agriculture is mostly based in a systematic destruction of both vegetation and land and this of course leads to a gradual reduction of ground water recharge areas, soil erosion and many related problems.

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