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## Linkages between sea-level rise and groundwater quality: Livelihood implications and interventions

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**Background:** Sea-level rise and groundwater linkages affect drinking groundwater and livelihood in general. What problems does it pose to coastal Ghana and what interventions can empower coastal people to adapt fully to groundwater quality problem. Communities close to the coastline likely to have their water compromised and their livelihood more affected than those far from the coastline.

**Methods:** The present study examines the linkages using 350 quantitative data, 12 focus group discussions, 8 in-depth interviews and 60 groundwater samples for laboratory analysis according to WHO 1993 guidelines.

**Results:** The result shows that sea-level rise affects groundwater system for well irrigation. Four major spatial groundwater groups were revealed: low salinity, acidic groundwater which is derived from the wells close to farmlands contaminated mainly with phosphorus; very high salinity waters which are not suitable for most domestic and irrigation purposes and two intermediaries of moderate pH and ionic metals. Salinization of the groundwater for irrigation has resulted in low yields and limiting adaptive capacity as agriculture is mainstay occupation. Responses to impacts are more burdensome to women than their male counterparts at (p=0.05).

**Conclusion:** Equitable distribution of potable water as well as livelihood empowerment will help alleviate poverty and empower coastal rural communities to come par with Ghana's targeted Millennium Development Goal 1 (MDG1) of reducing poverty to two-third across the nation.

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## Oversampling OMI $SO_2$ to identify emissions from large point sources and to determine lifetime of $SO_2$ emissions

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Power plant emissions play a key role in anthropogenic sulfur dioxide ($SO_2$) generated pollution. These emissions can severely impact climate and local air quality. Emission inventories for large point sources are sparsely limited, both spatially and temporally. However, with the acquisition of Satellites, a top-down estimate approach to $SO_2$ emissions can be made worldwide. $SO_2$ measurements from NASA's Aura Ozone Monitoring Instrument (OMI) can be used to augment limited data. OMI $SO_2$ measurements are averaged over a period of several years, which allows for the detection of point sources with high spatial resolution on a fine scale 3km$^2$ grid. Additionally, a method is presented to show that combining observational and/or modeled wind data to OMI $SO_2$ retrievals on a polar grid, can be used to determine the transportation of pollution and the mean lifetimes of $SO_2$ emissions. Centering the data on the point source coupled with the downwind conditions, not only can the general transportation direction and distance of emissions be found, but also an estimate for the mean $SO_2$ lifetime near the point source can be given. Running the analysis over a large temporal data set, and comparing various climate zones containing point sources, will assist in improving the statistical relevance of the results.

### Biography

Joseph L. Wilkins has completed his Bachelors at the University of Louisville in 2011. Currently pursuing his masters at Saint Louis University class of 2013.

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