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# Geological Evaluation for CO2 Storage in Salt - Case Study in Jupiter Block, Santos Basin

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## Introduction

The recent discoveries in Brazilian presalt found significant amounts of hydrocarbons with high content of mantellic $CO_2$. This gas is currently not commercial and often is a challenge for field development. When the full amount of $CO_2$ cannot be reinjected in a reservoir during production, an alternative is to store it in upper layers. Although Jupiter has a thin section of siliciclastic postsalt sediments, the massive salt column that acts as seal can also be a potential unit to store $CO_2$.

Storage in salt is made through dissolution caverns, when an injector well dissolves the salt with water in a controlled way. The space created is filled with the gas. This method also allows full recovery of $CO_2$ in case the fluid is necessary for EOR in the future, because the gas is inert to salt. To investigate if a salt layer has potential for storage, a geological assessment is necessary. This work used 3D seismic and well data to interpret and analyze salt sections in Jupiter to perform a site screening for dissolution caverns.

## Method and Theory

To check the viability of storage in salt, a primary geological evaluation is necessary. 3D seismic data and the logs from the 4 wells existing in the block area were used to perform a salt thickness map that allows to identify the zones of salt welds (higher risk) and the zones of halite accumulation. Halite has a more stable behaviour for designing dissolution caverns. Usually is found in the core of salt diapirs and has higher homogeneity than layered evaporite sequences with different dissolution rates. It usually appears in seismic data with transparent configuration, with absence of significant lateral continuity of reflectors. The well logs also help to distinguish halite from bittern salts, which can be extrapolated with seismic interpretation.

Another step was to identify the types of salt diapirism acting in the region, since tectonically active diapirism close to the seafloor is not considered safe for storage. Followed identification and interpretation of intrasalt structural pattern: thrust faults, folds and sutures zones, that can impact stability.

This way, potential risks identified are salt weld zones, deformed layered evaporite sequences and reactivation of faults in the post-salt section. Desired location for storage is a zone of halite accumulation in thick and wide salt walls or diapirs.

## Results and Conclusions

Jupiter block salt thickness map was created and salt tectonic analysis in the area was performed. The study presents areas that are geologically promising for storage intrasalt. They are located mainly in the core of the salt walls mapped, that can reach significant height and are stable tectonically, with no significant recent reactivation. They have significant space with homogenous composition.The high risk areas identified to be avoided are zones with intense deformed layered evaporites and thrust faults.