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## **Inventory of the occurrence of igneous rocks in the Santos and Campos basins, focusing on the post-salt zone - southeastern margin of Brazil**

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## Inventory of the occurrence of igneous rocks in the Santos and Campos basins, focusing on the post-salt zone - southeastern margin of Brazil

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### Abstract

The construction of feasible seismic images is strongly affected by the velocity model used in the seismic migration process, despite the aspects related to the acquisition parameters. In the Brazilian offshore basins, after the pre-salt first discoveries several concerns have been expressed regarding the way for building velocity models because the complexity of the reservoir overburden. It is easy to find out a huge documentation about the inhomogeneity of the salt section, or about the post-salt mini-basins presence or not, the existence of carbonate rafts and the concomitance of it with terrigenous sediments. However, after drilling almost 400 wells to reach the pre-salt reservoirs in the Santos and Campos basins, a new player has been frequently described: igneous rocks. These igneous rocks, initially considered as errant, currently have been well sampled, allowing a better comprehension of their inherent features. Navigating through the wells that sampled the igneous rocks it is possible to infer they vary from rocks of low-velocity (~ 3,000 m/s) to high-velocity (~ 6,000 m/s) measured from sonic information. Therefore, new questions of seismic velocity modeling for seismic purposes emerge: 1) How to properly characterize the igneous rocks for seismic purposes? 2) How the presence of igneous rocks affects seismic images? 3) How the presence of igneous rocks acts as an ally in quantification the hydrocarbon volumes? In this work, considering several wells that sampled igneous rocks in the sections above the reservoir, we intend to address these questions. Our first results illustrate the areal distribution of those igneous rocks, through data from selected and representative wells from the Campos and Santos basins, perform several statistical analyses of the compressional velocity (Vp) delimited by igneous lithotypes and demonstrate which type of those igneous rocks has a higher impact on Vp behavior, consequently affecting the seismic imaging quality. In the next steps we intend to evaluate the existing velocity models, how they are affected by the anomalous velocity of igneous bodies and how they can influence the rock gross volume of the reservoir, consequently delivering feasible inputs to deal with hydrocarbon volumes estimations and the inherent uncertainties. Thus, we are inspired by related publications with proven methods that incorporate velocity heterogeneities in the salt layer of Brazilian basins, as well as those that consider velocity heterogeneities in lithotypes such as carbonates from the Albian-Cenomanian in the salt portions of these basins. We believe that the proposed approach, which now incorporates igneous rock, can yield significant benefits for seismic imaging, delivering inputs for quantifying reservoir rock volumes estimations and related uncertainties.