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FWI for Model Updates in Large – Contrast Media

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Summary

We describe a new robust solution for recovering the long-wavelength features of a velocity model with FWI. The method uses reflected and transmitted wave modes, i.e. the full wavefield, to recover high-resolution velocity models. Our new FWI gradient enables reliable velocity updates deeper than the maximum penetration depth of diving waves, hence reducing FWI's dependence on ultra-long offsets. This makes this implementation of FWI well suited for being used in reprocessing of legacy data, where long offsets are often in short supply. Results from applying the new FWI gradient to field data show that we can combine both transmitted and reflected energy in a global FWI scheme to obtain high-resolution velocity models without imprint of the reflectivity on the velocity updates. This will be illustrated with examples from the Gulf of Mexico and Brazil.