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Towards Lateral Broadband

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Summary

New acquisition techniques and the evolution of broadband processing in the past ten years have enabled the extension of the frequency bandwidth from the conventional three octaves bandwidth [10Hz-80 Hz] to a six octaves broadband bandwidth [2.5Hz-160Hz]. Despite this impressive achievement, some problems still remain:
- The broadband processing sequence has become very complex.
- This processing sequence makes a heavy use of sparse tau-p transforms in steps like receiver deghosting and regularization. However, the underlying assumption that a shot point can be locally decomposed in a few linear events can be questionable.
- The lateral resolution has not increased in the same proportion as the vertical resolution.
In order to solve these problems, we show that we can obtain a significant increase in lateral resolution by using for the final imaging a least-squares migration with ghost and multiple modeling, allowing the deghosting, regularization and multiple attenuation being handled by the inversion. This is assessed on a real 3D dataset with depth-slices showing an increase in wavenumber bandwidth similar to the increase already obtained in frequency bandwidth.

Abstract

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