AVO responses as modelled with a finite-difference program

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- Introduction: classic AVO cases
- Surface seismic records
- F-D / Zoeppritz amplitude comparisons
- Wavefront / interface movies
- Conclusions
- Acknowledgements

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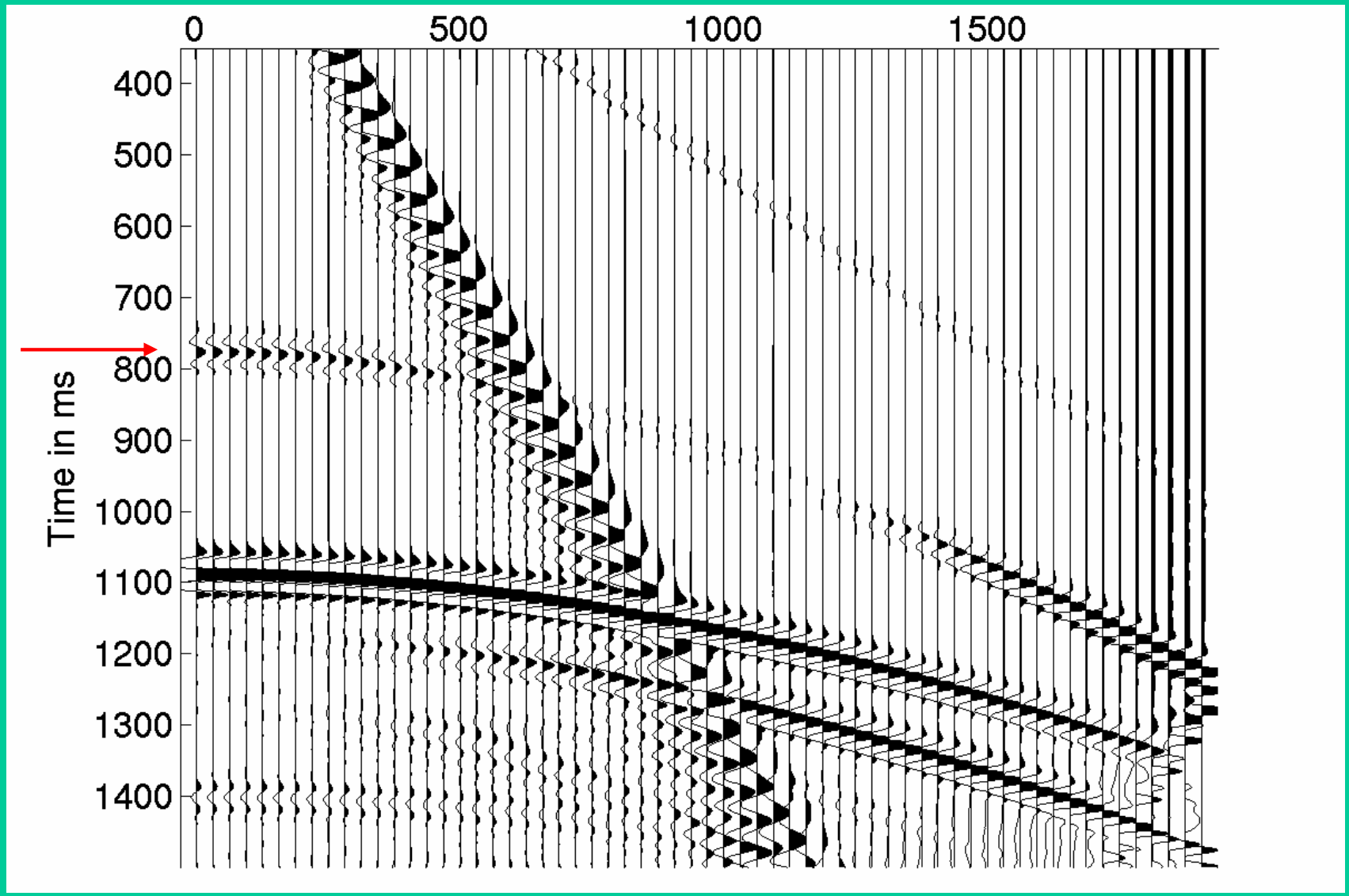
Classic AVO parameters table

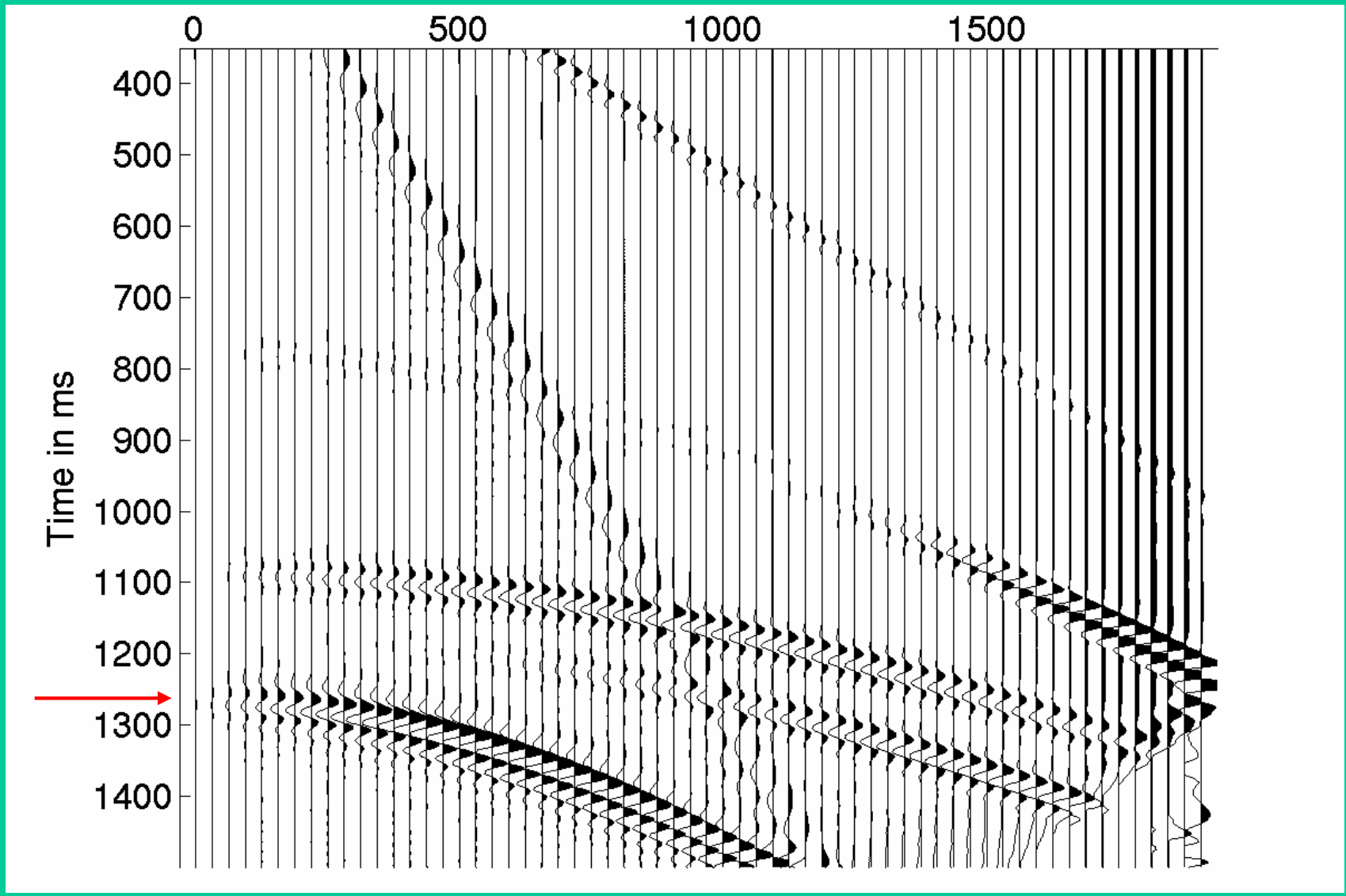
Class	AVO 1	AVO 2	AVO 3	AVO 4
$\alpha 1$	2000	2000	2000	2000
$\beta 1$	879.9	879.9	879.9	1000
$\rho 1$	2.4	2.4	2.4	2.4
$\alpha 2$	2933	2400	1964	1599
$\beta 2$	1882	1540	1260	654.3
$\rho 2$	2	2	2	2.456

Vertical displacement seismic record



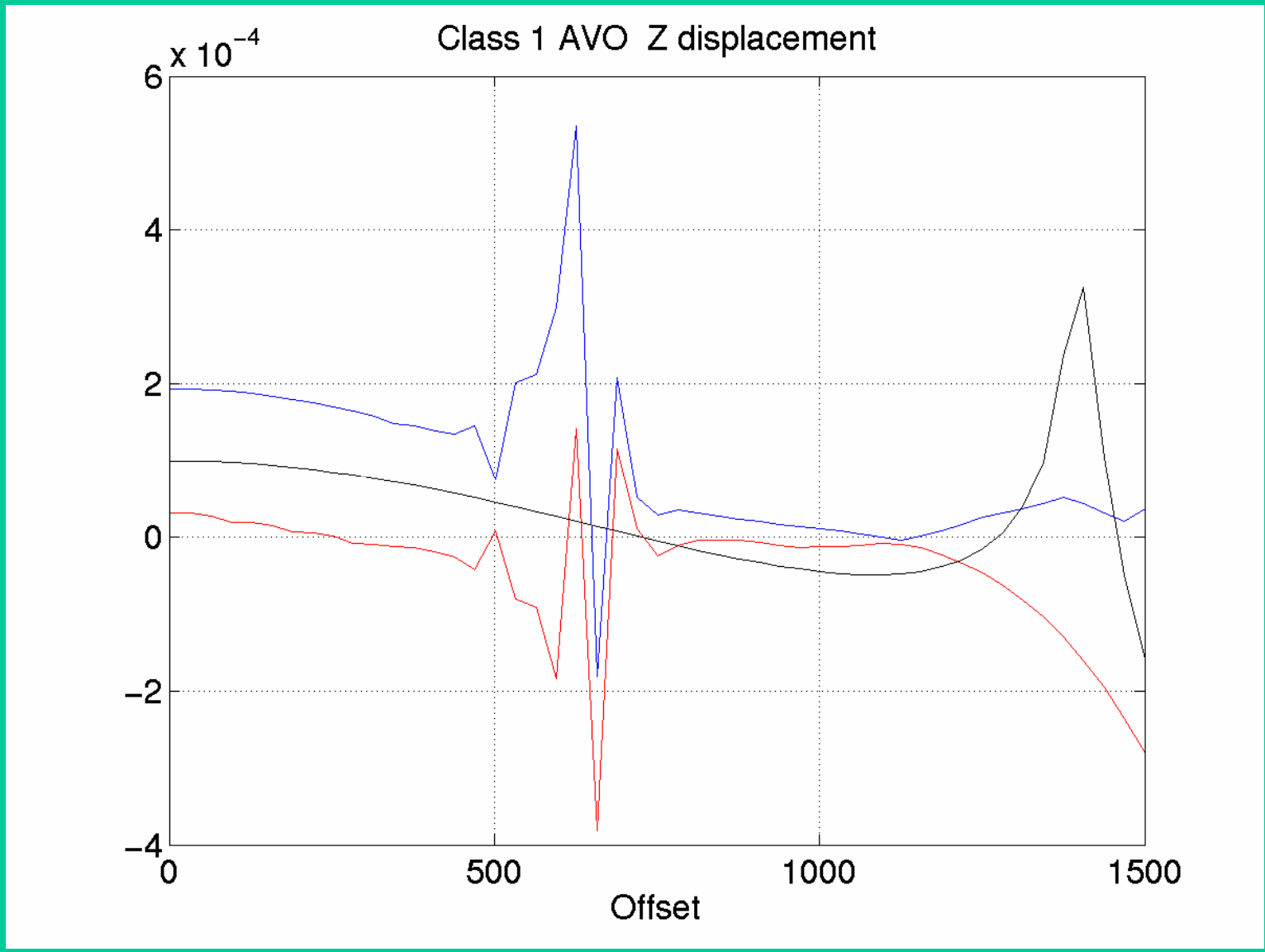
Arrow indicates reflected pressure wave

Horizontal displacement seismic record



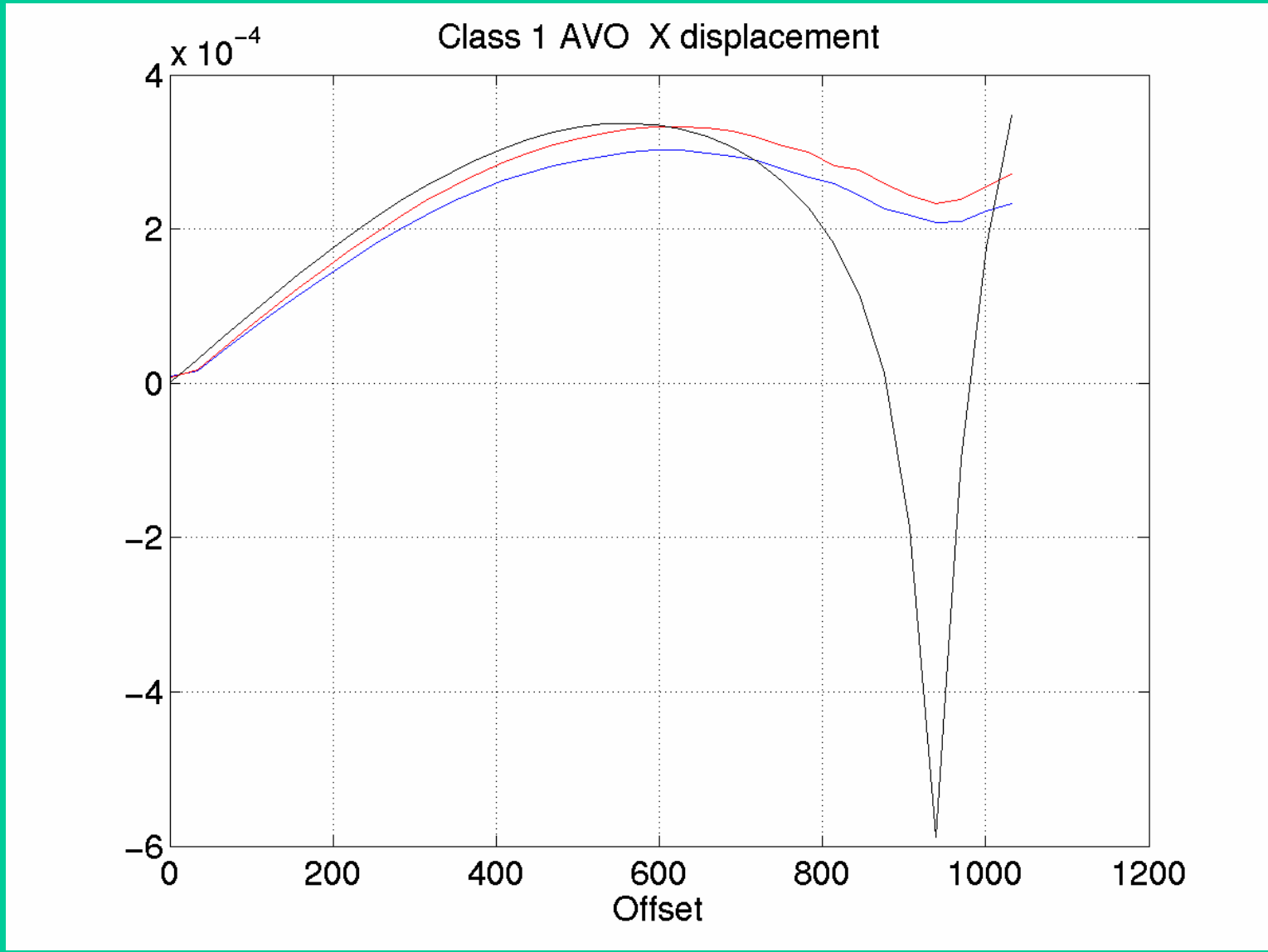
Arrow indicates converted shear wave

Model amplitudes along reflected event



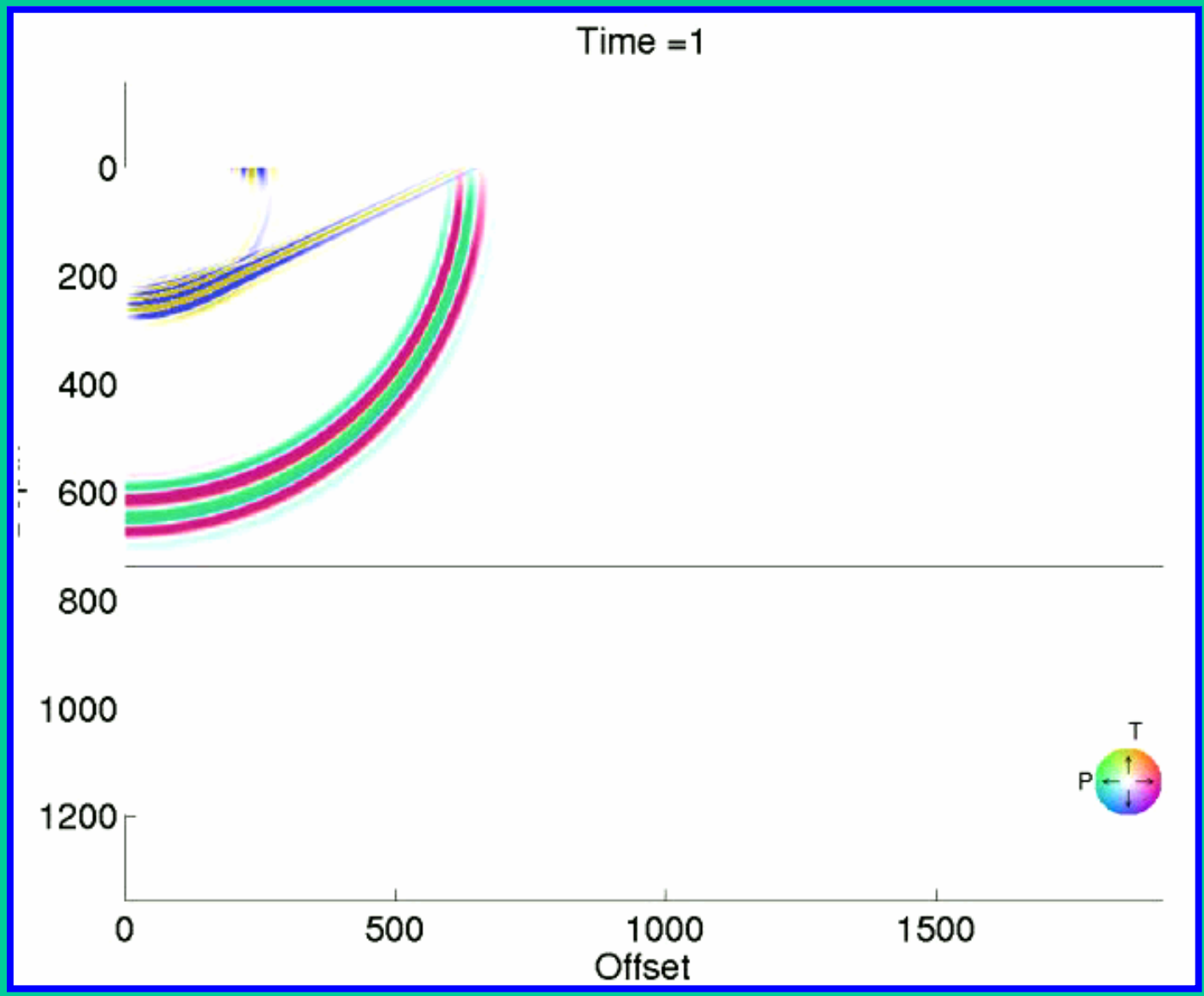
Blue – peak, red – trough, black - Zoeppritz

Model amplitudes along converted reflection

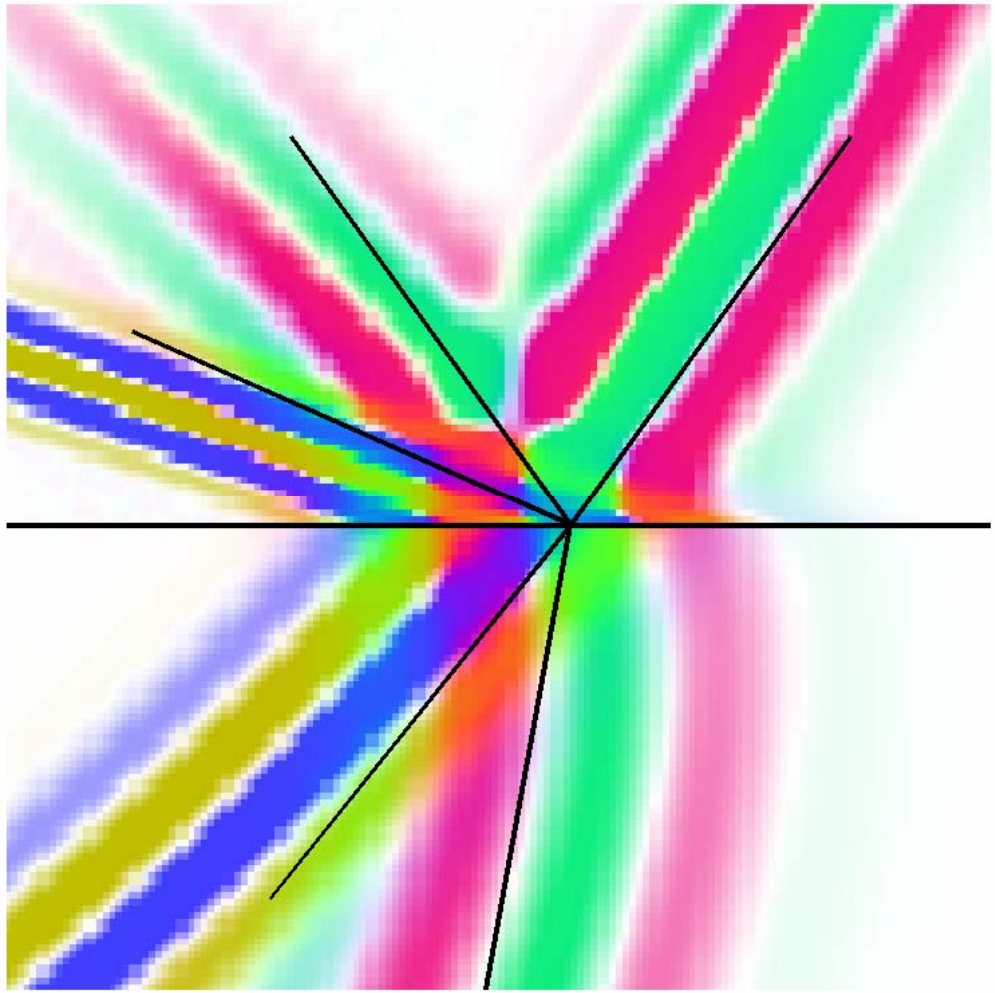


Blue/red – peak/trough, black - Zoeppritz

AVO type 1 movie

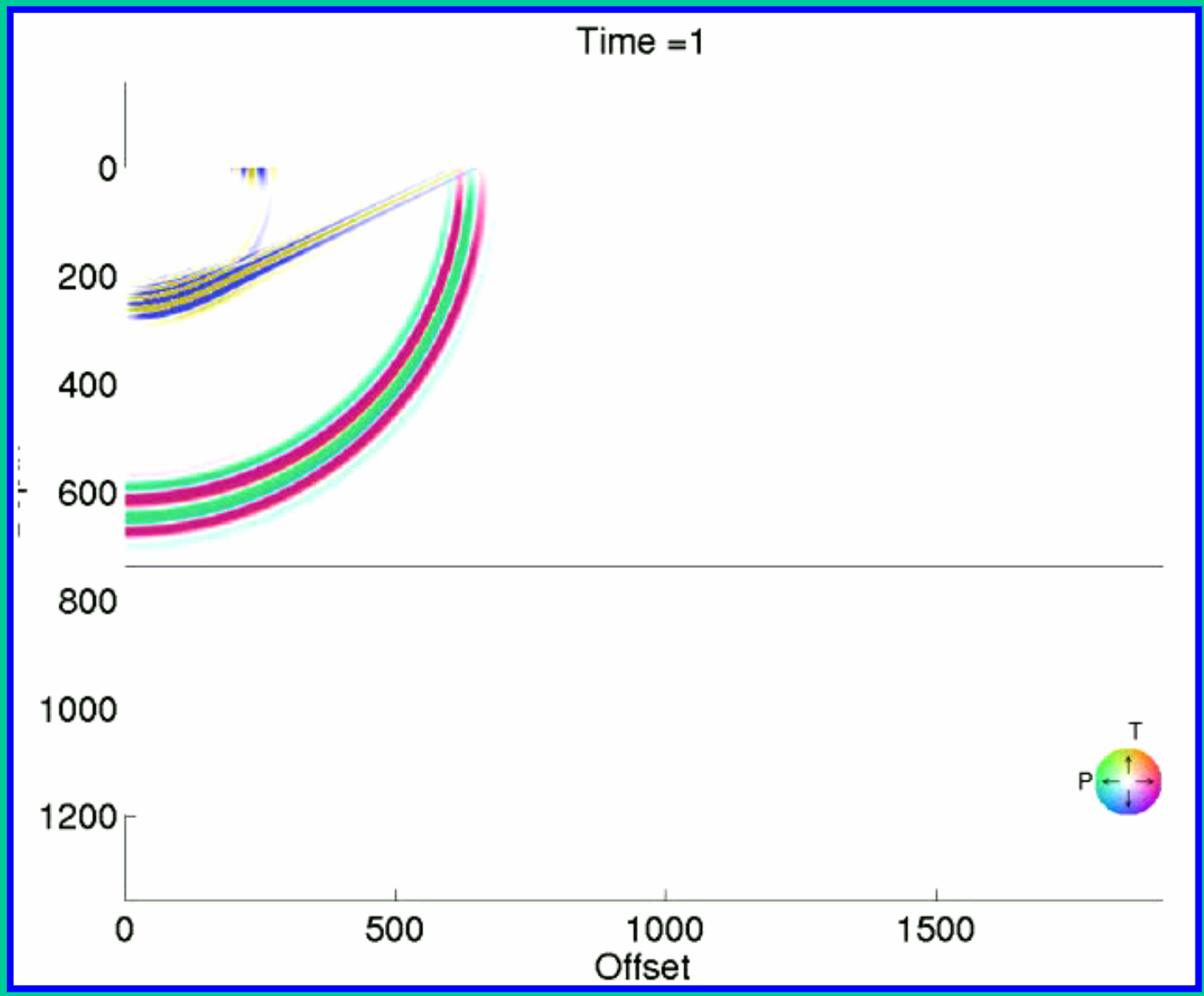


AVO type 1 movie

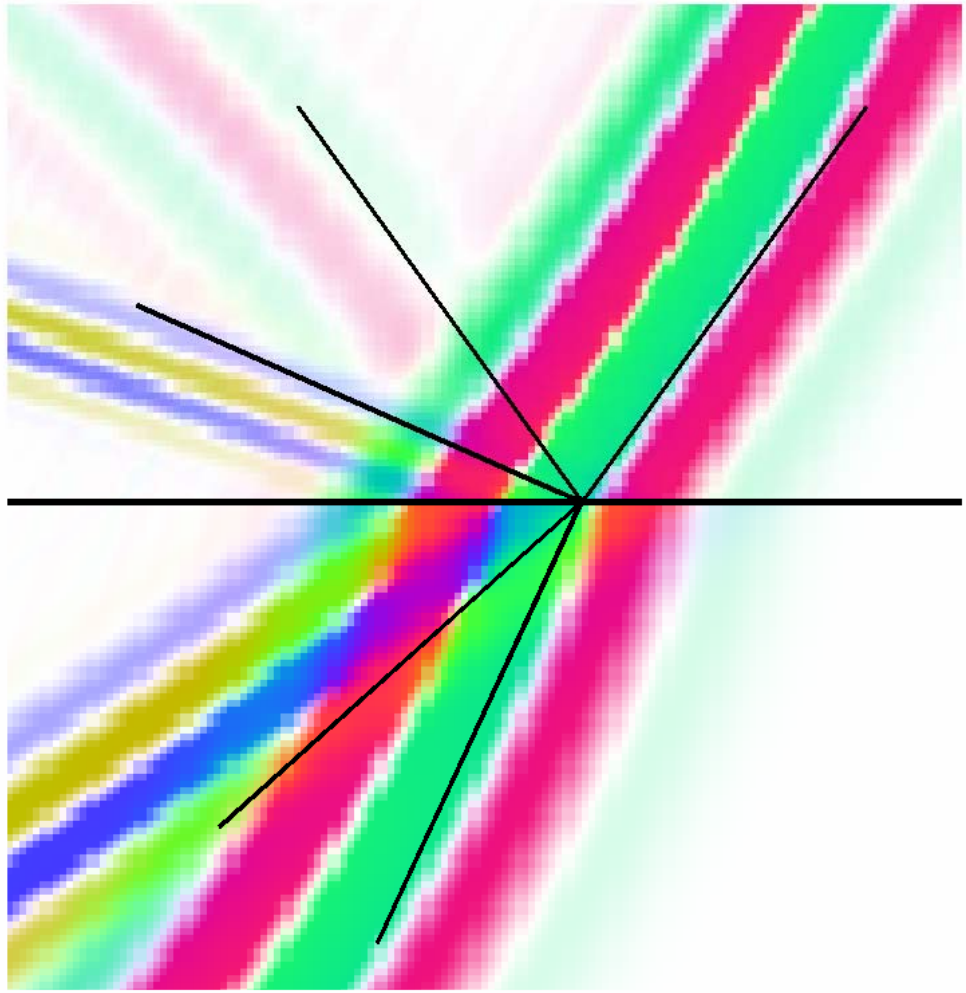


Quintuple point at 1000 m.

AVO type 2 movie

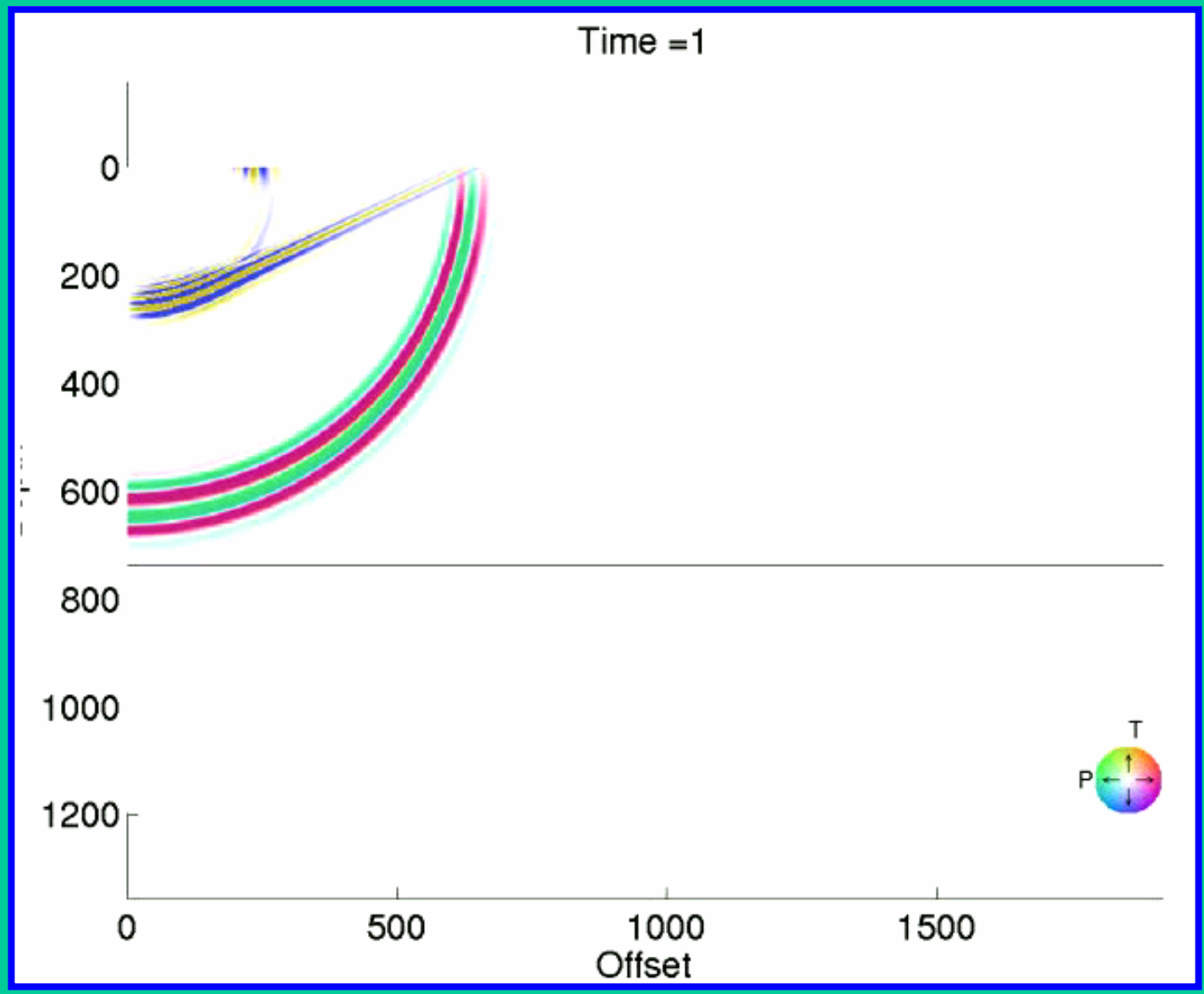


AVO type 2 movie

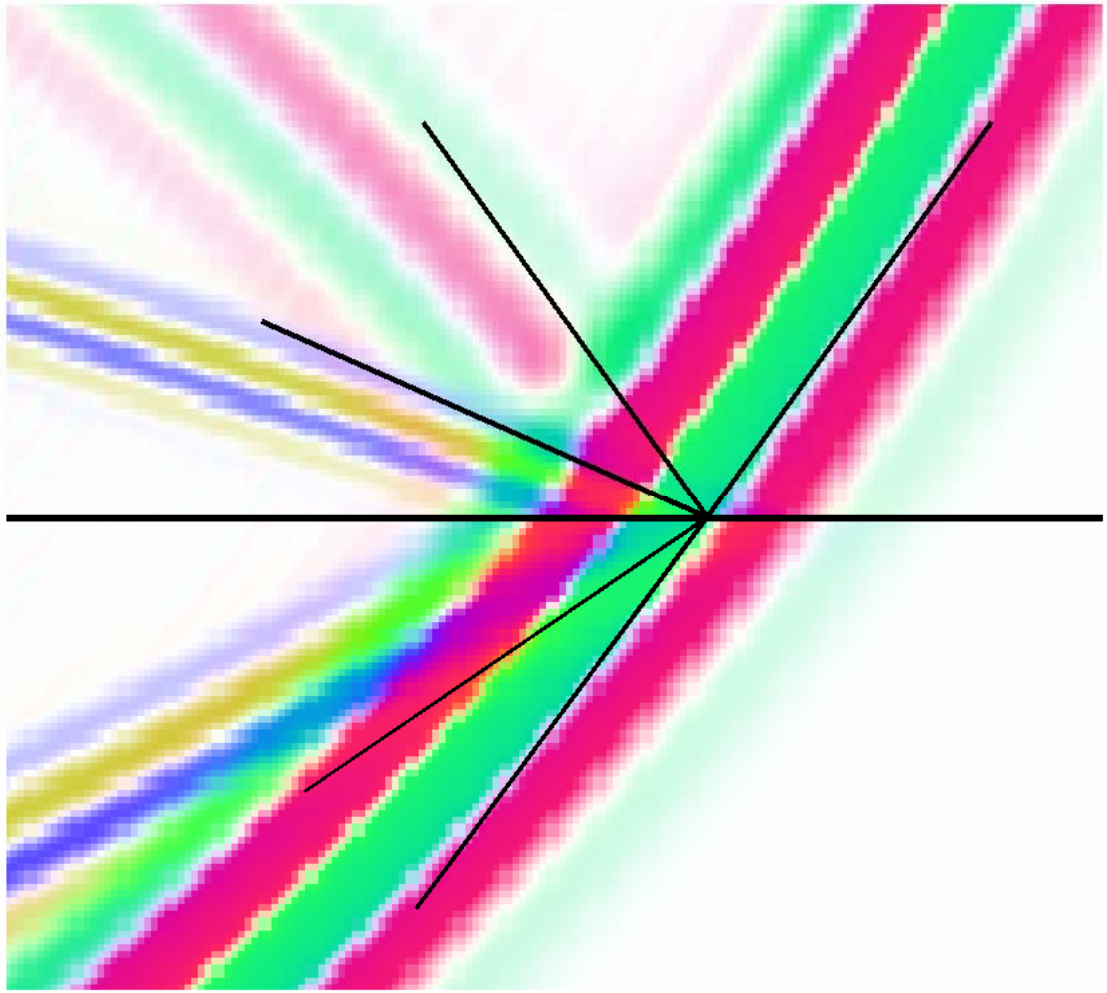


Quintuple point at 1000 m.

AVO type 3 movie

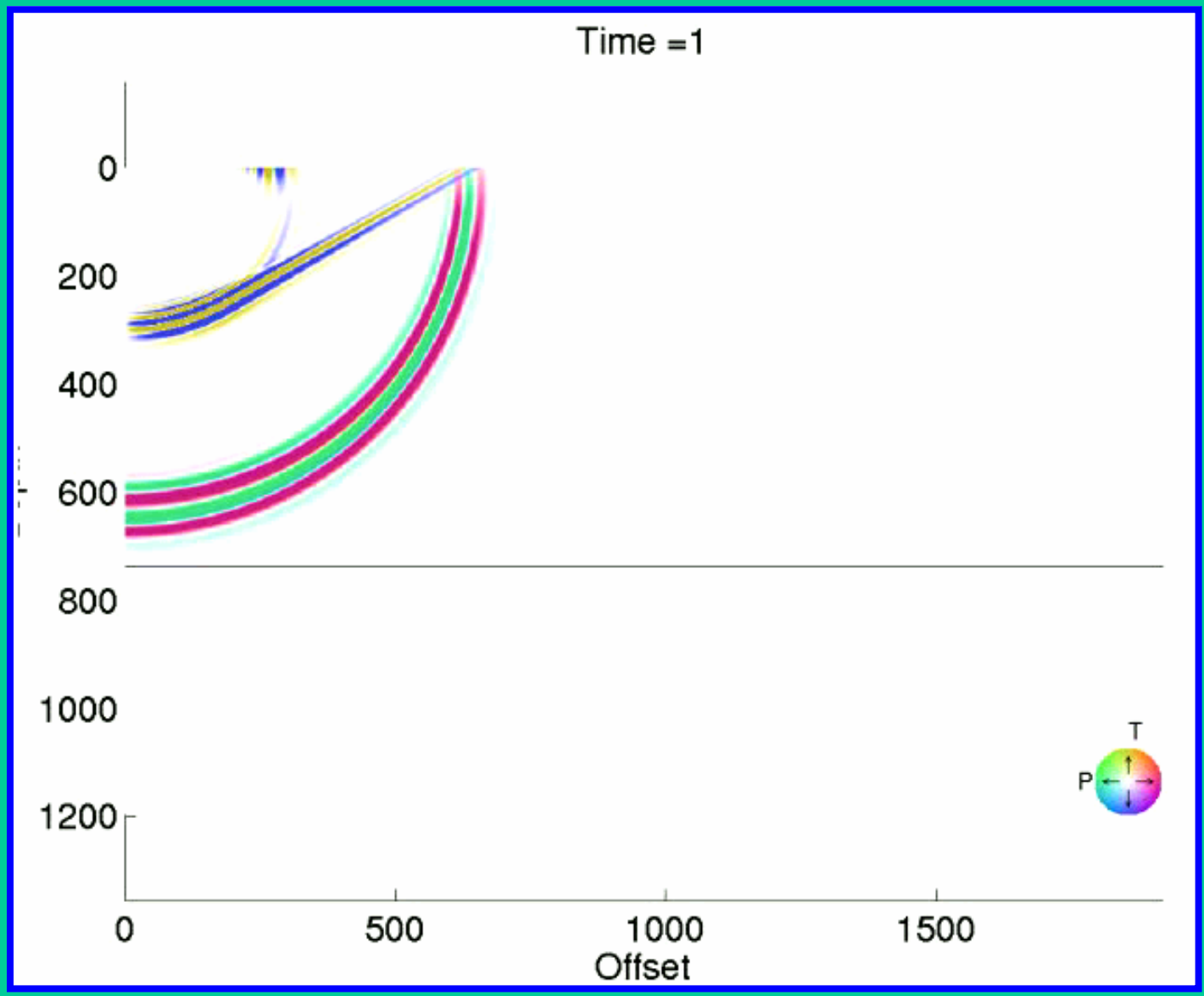


AVO type 3 movie

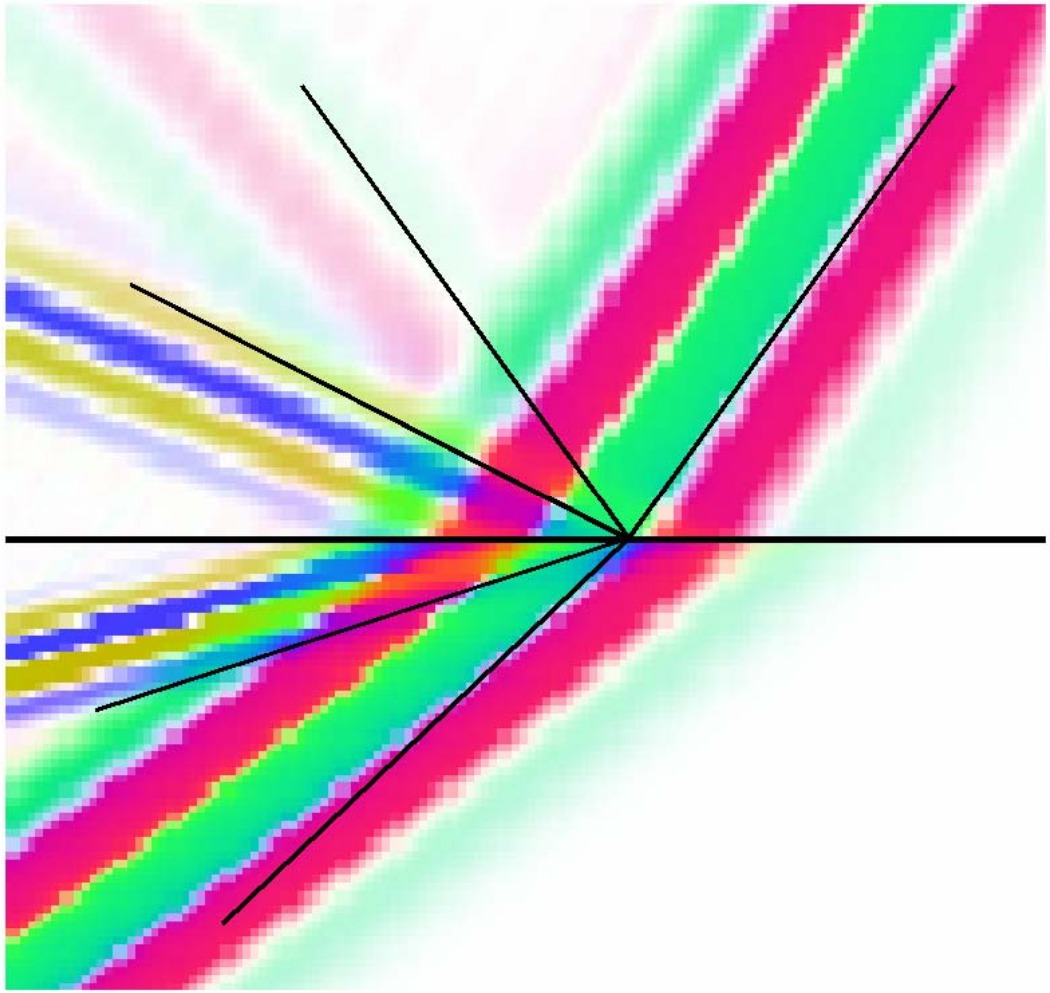


Quintuple point at 1000 m.

AVO type 4 movie



AVO type 4 movie



Quintuple point at 1000 m.

Conclusions

- The Zoeppritz equations and finite-difference models have many common features.
- Finite-difference models might prove useful for some quantitative predictions.
- Finite-difference models might show realistic effects beyond the critical angles.

Future work

- The reflection amplitudes at the finite-difference ‘quintuple’ point will be checked to see if the physics might be better understood.

Acknowledgements

We would like to thank the CREWES sponsors for their generous support.

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