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Different gridding methods and their influence on surface wave tomography

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Seismic waveform data of 106 broadband digital stations in South China between 1999 and 2012 were initially collected. Then surface-wave waveforms for shallow and moderate focal-depth events with magnitude Ms $\geq$ 5.0 were analyzed. We processed Rayleigh waves and obtained their group velocities by using frequency-time analysis method. Checker-board tests were used to choose an appropriate grid size for following inversions. To accommodate the possible sutures, Chenzhou-Linwu fault and Jingxian-Anhua fault between Cathaysian and Yangtze blocks in South China, we set up two meshes to test the effects of different model parameterizations. One mesh had the regular grids with boundaries parallel to latitude or longitude (regular grid) and another mesh used grids with boundaries approximately parallel or perpendicular to the strike of Chenzhou-Linwu fault (slant grid). The different meshes were utilized by coordinate transformation. Ray coverage density and azimuth coverage of two gridding methods were compared, and the slant grid shows a better ray coverage uniformity along the fault strike than the regular grid, but azimuth coverage for both meshes are similar. After inverting the path-averaged group times by means of a damped least-squares approach, we have acquired location-dependent group velocities on a $1.5^\circ \times 1.5^\circ$ grid and constructed Rayleigh wave group velocity maps at periods from 10 to 100s. Resolution and covariance matrices have been computed in order to evaluate the quality of the results. Similarly, slant grid has some improvements in group velocity images at various periods on some major characters. Results above indicate that the trial of slant gridding method is reasonable.