The evaluation of the surface-wave Fresnel zone based on the ray tracing in laterally heterogeneous media

Kazunori Yoshizawa[1], Brian L. N. Kennett[1]

[1] RSES, ANU

http://wwwrses.anu.edu.au/~kazu/

   For short-period surface waves, which are likely to be affected by strong heterogeneity, ray theory is not sufficient and we need to consider off-great-circle propagation as well as the effects from the region around a ray. This region is described by the first Fresnel zone, but it is not simple to calculate this exactly in laterally heterogeneous media.
   We have developed an efficient method to calculate the surface-wave Fresnel zone based on Cerveny & Soares (1992) by working with a "physical ray" with finite width rather than a "geometrical ray". This approach has broad applications, such as waveform synthesis including mode-coupling, and the resolution of seismic tomography using the ray methods.