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Velocity models inferred from inversion of H/V spectral ratio of ambient noise and its first application to a volcanic environment: the Ijen Caldera, Indonesia.

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It is now well accepted that the average autocorrelation of seismic noise at a single station is proportional to the imaginary part of the Green's function when both source and receiver are the same. More recently, it has been established that the horizontal and vertical imaginary parts of the Green's function, i.e. the horizontal and vertical transfer functions, should be used to calculate the horizontal to vertical spectral ratio of ambient noise (HVSR). The HVSR is a popular technique that only requires a short-term (20 minutes) 3 components recording of seismic noise. Assuming an unbounded multi-layer model for the computation of the Green function, one can conduct the HVSR inversions to assess the 1D velocity structure of the subsurface. This approach was used to constrain several 1D velocity models (certain up to 3 km deep) of the Ijen caldera (Java, Indonesia) already established by the inversion of dispersion curves. Additionally, 84 HVSR measurements were also performed on Kawah Ijen volcano and allowed to provide a map of the local site effects. The velocity models obtained and the great outcrop of the crater rim allow robust and direct interpretation of the underground geology. Using a first order approximation, some mechanical proprieties of the shallower layers can be derived and the depth of an important lithological interface can be followed all around the Kawah Ijen crater.