Figure 4. The fundamental resonance frequency at a site was determined by a spectral analysis of the horizontal and vertical components of the recorded seismic noise. The amplitudes of the spectra of the vertical and two horizontal components of the microtremors for each of the 60-second time intervals were calculated by the Geopsy program. The average of the amplitudes for the horizontal components was divided by the vertical component, and this ratio (the HVSR) was plotted as a function of frequency. The colored lines in this graphical output from the Geopsy program correspond to the similarly colored time intervals shown in figure 3. The fundamental resonance frequency in this example from site 00MW0584 is 1.06 Hz defined by the peak in the average HVSR plot (average and standard deviation shown by the solid and dashed black lines, respectively). An empirical equation (see accompanying pamphlet) developed for Cape Cod by Lane and others (U.S. Geological Survey, written commun., 2011) was used to estimate the sediment thickness from the fundamental resonance frequency. The resulting thickness was subtracted from the land-surface altitude to obtain the bedrock-surface altitude.