Movie 1： Instantaneous flow structures visualized by volume rendering of temperature anomaly for , *Ra* = 109, *Pr*=4.38, and , corresponding to figure 1(*a*, *d*). For the standard RB turbulence without any vibration, intense turbulent fluctuations generate strong distortions of isotherms and massive eruptions of thermal plumes are randomly triggered from the thermal boundary layer. Hot and cold plumes are then transported and mixed by the large-scale wind.