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In this talk, we consider the dynamics of the stratified rotating Boussinesq equations, which are a basic model in geophysical fluid dynamics. First, for the case where the Prandtl number is greater than one, a complete stability and bifurcation analysis near the first critical Rayleigh number is carried out. Second, for the case where the Prandtl number is smaller than one, the onset of the Hopf bifurcation near the first critical Rayleigh number is established, leading to the existence of nontrivial periodic solutions. (Received January 22, 2007)