

*Movie 1:*

The movie shows a succession of snapshots from a numerical simulation of Rayleigh-Bénard convection, in which a rotating box of fluid is heated from below. The colour indicates the sign and strength of the axial vorticity of the flow (in units of  $2\Omega$ ) in a horizontal cross-section through the box at depth  $z = 0.25$ . Red corresponds to cyclonic vorticity and blue to anticyclonic vorticity. This movie is taken during the slowly growing phase of the kinetic energy, and shows the formation of a large-scale cyclone from clustering of smaller scale cyclones. For this simulation, the Ekman number is  $10^{-4}$ , the aspect ratio is 4 (series S3) and the compensated Rayleigh number is 37. Time is measured in units of  $1/(2\Omega)$ .

*Movie 2:*

The movie shows a succession of snapshots from a numerical simulation of Rayleigh-Bénard convection, in which a rotating box of fluid is heated from below. The colour indicates the sign and strength of the axial vorticity of the flow (in units of  $2\Omega$ ) in a horizontal cross-section through the box at depth  $z = 0.25$ . Red corresponds to cyclonic vorticity and blue to anticyclonic vorticity. This movie is taken during the saturated phase of the kinetic energy, and shows that the flow is dominated by a large-scale cyclone. A weaker anticyclonic circulation advects smaller scale vortices in the surroundings of the cyclone. For this simulation, the Ekman number is  $10^{-4}$ , the aspect ratio is 4 (series S3) and the compensated Rayleigh number is 37. Time is measured in units of  $1/(2\Omega)$ .