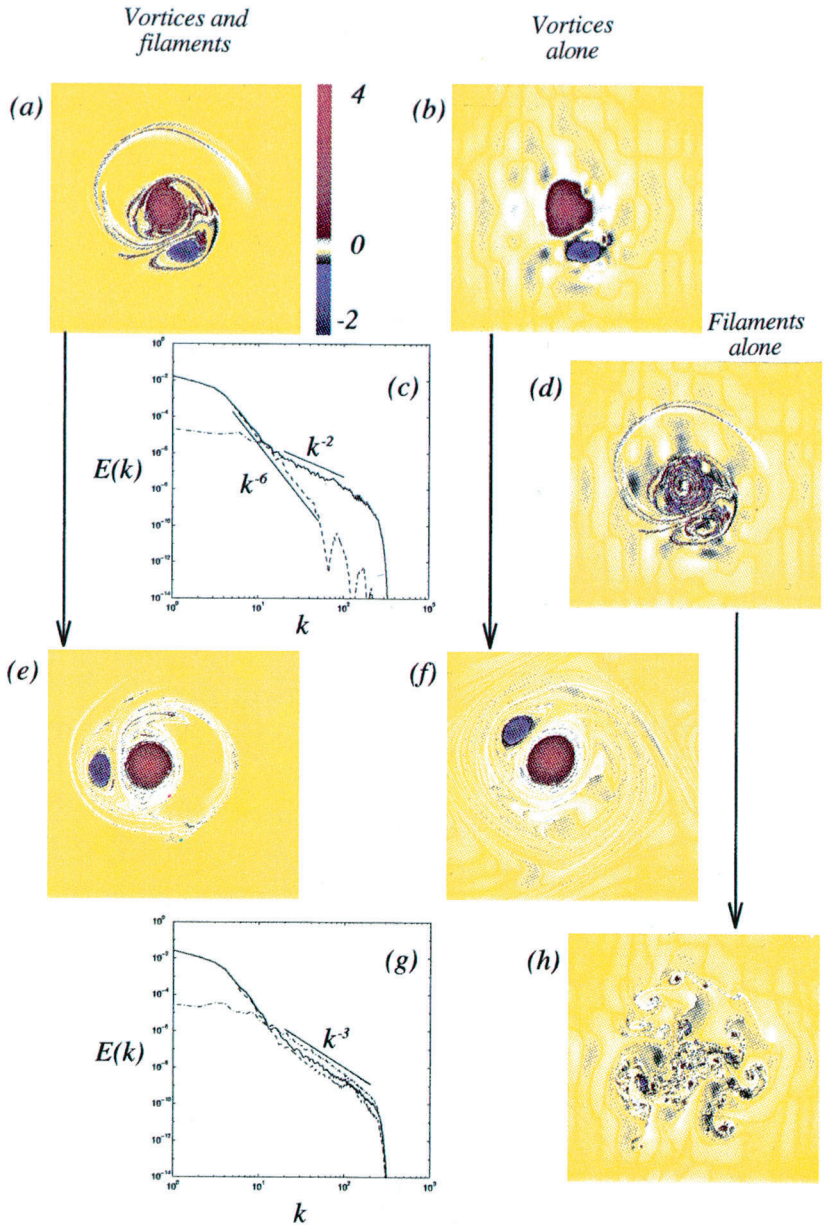
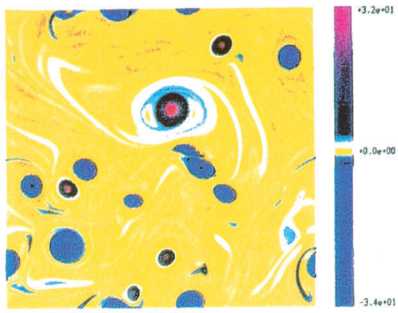
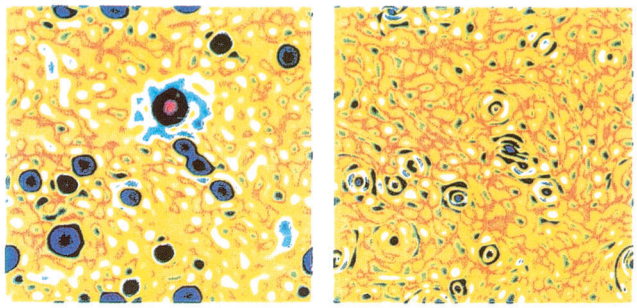


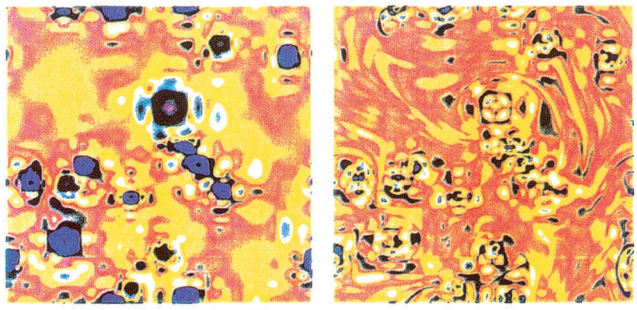
Plate 4.6 Dynamical analysis of coherent structures and incoherent background flow. (a) Total vorticity at $t = 30$ computed with a resolution 1024^2. (b) Vorticity corresponding to the coherent vortices alone at $t = 30$. They are made up of 31 strong wavelet packet coefficients which contain 83% of the total enstrophy. (c) Energy spectra at $t = 30$. In green: the total energy spectrum. In red: the coherent vortices energy spectrum. In blue: the filament energy spectrum. (d) Vorticity corresponding to the filaments alone at $t = 30$. They are made up of 1 048 545 weak wavelet packet coefficients which contain 17% of the total enstrophy. (e) Integration of the total vorticity until $t = 120$. (f) Integration of the coherent vortices alone until $t = 120$. (g) Energy spectra at $t = 120$. In green: the total energy spectrum. In red: the coherent vortices energy spectrum. In blue: the filament energy spectrum. (h) Integration of the filaments alone until $t = 120$.



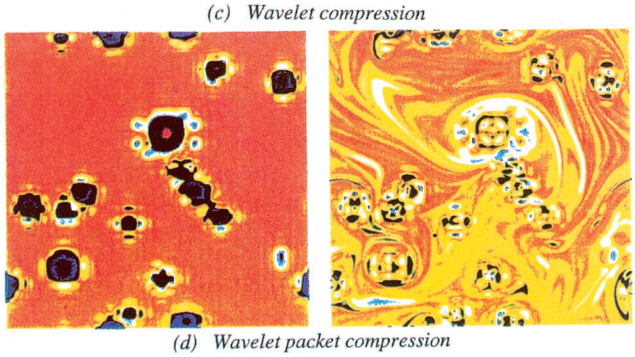
(a) *Reference*



(b) *Fourier compression*



(c) *Wavelet compression*



(d) *Wavelet packet compression*

Plate 4.7 Nonlinear compression of a vorticity field. In each case the reconstructions using the strong coefficients (containing 95% of the total enstrophy are displayed on the left, and using the weak coefficients (containing 5% of the total enstrophy) are displayed on the right. (a) Uncompressed vorticity field computed with a resolution of 512^2. (b) Compression in a Fourier basis (813 strong coefficients). (c) Compression in a wavelet basis (338 strong coefficients). (d) Compression in a wavelet packet basis (156 strong coefficients).