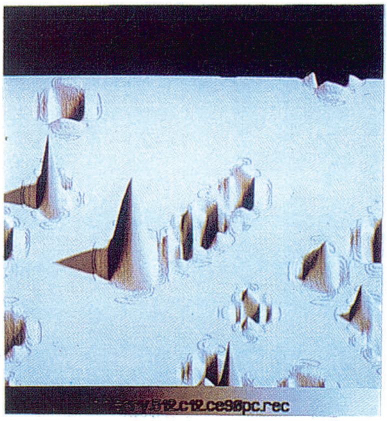
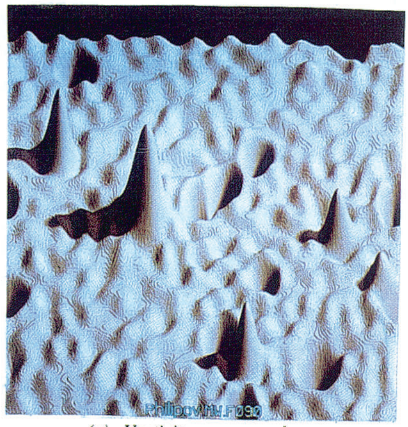
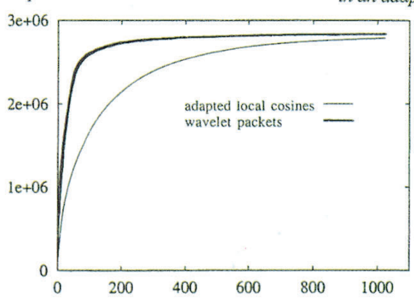
(a) Uncompressed vorticity field



(b) Vorticity compressed in a wavelet packet basis

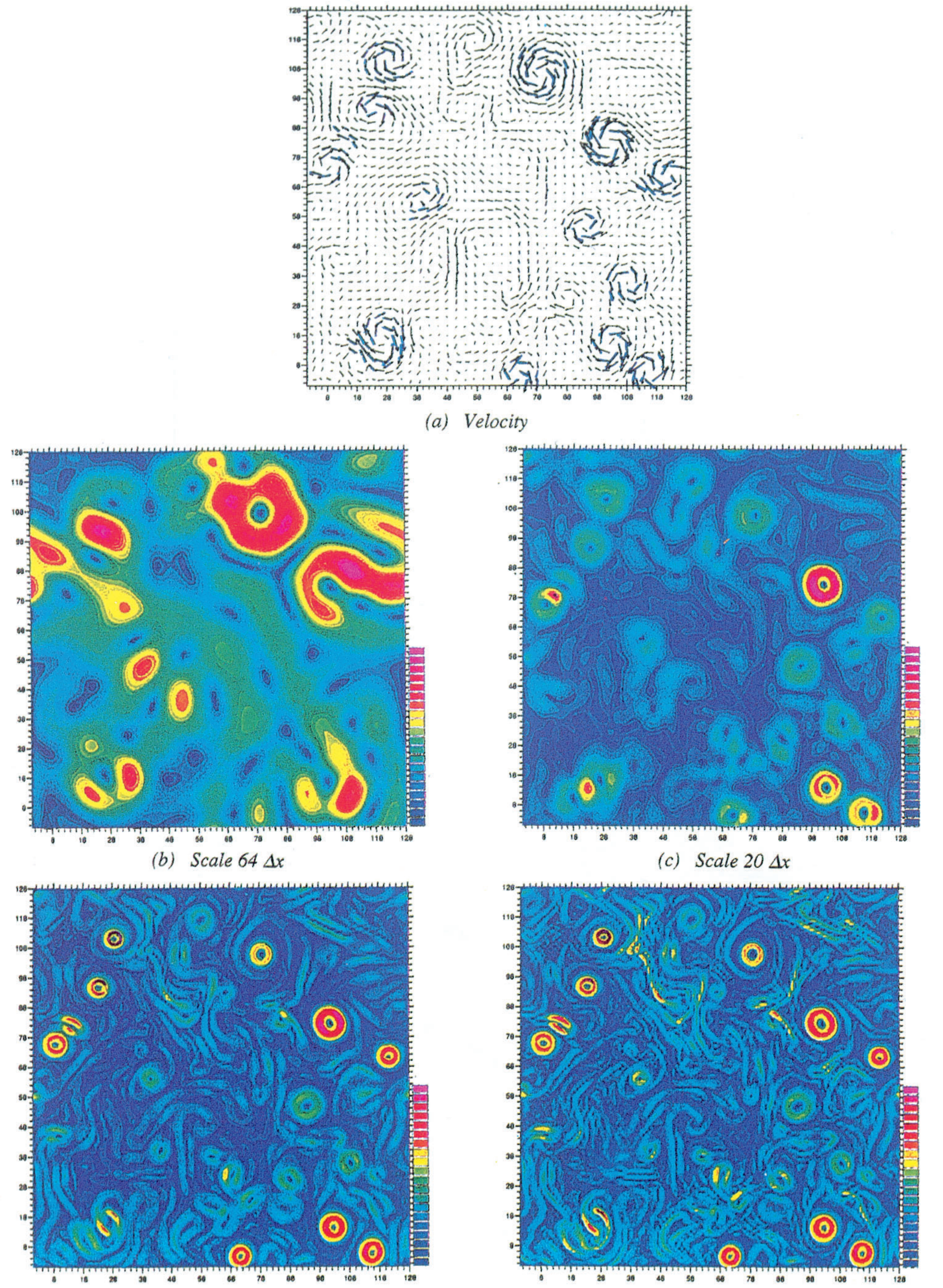


(c) Vorticity compressed in an adapted local cosine basis



(d) Amount of enstrophy retained for each compression

Plate 4.4 Comparison between wavelet packet and adapted local cosine compression (this computation was done in collaboration with Echeyde Cubillo). (a) The uncompressed vorticity field computed with 128^2 modes. (b) The vorticity field reconstructed from the 70 strongest wavelet packet coefficients, which contain 90% of the enstrophy. (c) The vorticity field reconstructed from the 425 strongest adapted local cosine coefficients, which contain 90% of the total enstrophy. (d) Enstrophy contained in the retained coefficients versus their number. We observe, for instance, that 70 wavelet packet coefficients retain 90% of the total enstrophy, while 70 adapted local cosine coefficients retain only 50% of the total enstrophy.



(a) Velocity

(b) Scale 64 Δx

(c) Scale 20 Δx

(d) Scale 8 Δx

(e) Scale 2 Δx

Plate 4.5 Wavelet Reynolds number (this computation was done in collaboration with Thierry Philipovitch). (a) Velocity field computation with resolution 128^2 ($\Delta x = 1$ unit length between two grid-points). (b) Wavelet Reynolds number at scale $64\Delta x$, which fluctuates between 148 and 2700 with a mean value of 1713. (c) Wavelet Reynolds number at scale $20\Delta x$, which fluctuates between 31 and 578 with a mean value of 365. (d) Wavelet Reynolds number at scale $8\Delta x$, which fluctuates between 1 and 27 with a mean value of 17. (e) Wavelet Reynolds number at scale $2\Delta x$, which fluctuates between 0 and 3 with a mean value of 2.