



Singular Disturbed Components of Stratified Flows and their Impact on Transport of Contaminants

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New classification of a fluid flow components based on complete solutions of fundamental equations includes both regular larger scale and rich family of fine singular disturbed components. Fine components are responsible for dissipation, production and transport of vorticity and super diffusive transportation of passive scalars. Manifestation of singular components was studied analytically and experimentally inside 2D and 3D periodic internal waves, wave fields past uniformly moving obstacles. Experiments performed using markers, schlieren instruments and conductivity sensors in laboratory tanks. Restructuring of interfaces and their transformation into vortices and vortex systems were registered. New structural elements that are “tubular structures were visualized near central of disk and poles of the sphere performing periodic oscillations in a fluid. They are transformed into autocumulative jets with increasing amplitude and number of oscillations. Autocumulative jets are long, narrow and fast vortices placed on the vertical axis of initial motions. High gradient envelopes bound the jets. Their tips act as an instantaneous source of internal waves. Transformation of “tubular structures” into autocumulative jets is studied in tiny details. Extended singular components act as attractor for contaminants and provide their overdiffusion propagation. Dates of measurements are compared with analytical calculations.