

Modelling of Gulf Stream by the von Kármán vortex street

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The new mathematical model for a stream function of a meandering jet of Gulf Stream is suggested [1]. It based upon a modification of the von Kármán vortex street stream function. The suggested modification allows one to approximate experimentally found by Bower [2] main patterns in the meandering jet of Gulf Stream. This stream characterizes by the following coherent structure elements [2-4] in a coordinate frame moving with a speed of the meander: 1) an eastward-propagating meandering jet; 2) regions of recirculating fluid below and above meander crests and troughs; 3) regions of westward-propagating fluid below and above the jet and recirculation regions.

Figure 1 shows the coherent structure elements of the meandering jet of Gulf Stream, constructed by using the model proposed by Somelson [3,4]. Figure 2 shows the same elements constructed on the base of the von Kármán vortex street. The arrows show directions of motion. The eastward-propagating meandering jet is shown as regions *A* (fig.1 and 2); regions of recirculating fluid below and above meander crests and troughs are indicated as regions *B* (fig.1) and regions *C* and *U* (fig.2); and regions of westward-propagating fluid below and above the jet and recirculation regions are shown as *D*.

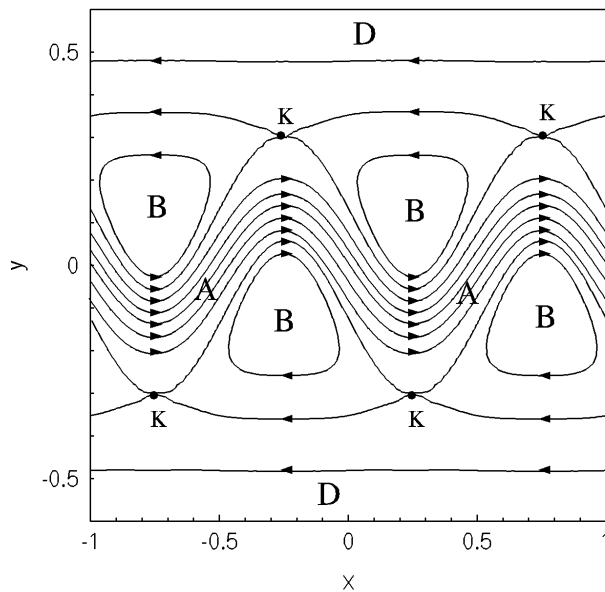


Fig.1. Coherent structure elements (model of Somelson)

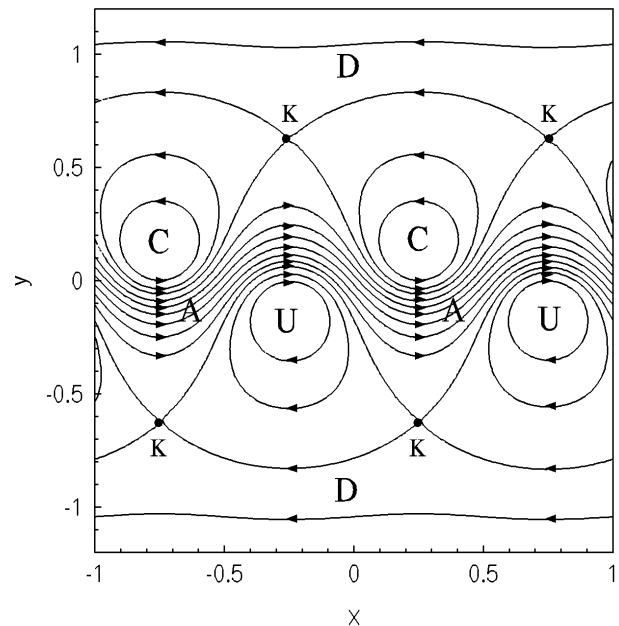


Fig.2. Coherent structure elements (the von Kármán vortex street)

References

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