A new method to define and quantify complex blood flow is presented. The standard deviations of real-time in vivo vector flow angle estimates are used. Using vector flow ultrasound imaging both carotid bifurcations of two healthy volunteers were scanned. Scanning was performed with a 7.6 MHz linear transducer (8670, B-K Medical, Denmark) and a commercial vector flow ultrasound scanner (ProFocus 2202, B-K Medical). Eight video sequences of one cardiac cycle were obtained. In every frame boxes were placed to define the common carotid artery (box1) and the carotid bulb (box2). The standard deviation for the vector angle estimates was calculated for each box in every frame. For comparison three ultrasound experts evaluated the presence of complex flow in every box. The trial was blinded. For every sequence the mean standard deviation of the vector angle estimates were calculated for box1 \{39;32;35;41;38;39;32;27\} and box2 \{22;12;11;13;15;22;17;21\}. Mean values and standard deviations of the visual evaluations were calculated for the two boxes in every each sequence. From regression analysis a standard deviation above 30 corresponds to complex flow according to the evaluation given by three experts. Complex flow patterns can be visualised and quantified with real-time in vivo vector flow. Good agreement between visual evaluation and the quantitative method has been shown. A standard deviation of vector angle estimates above 30 is proposed to define complex blood flow.