**ESM1:** Time-series $C_p$ distributions obtained by the fast-response PSP ($\alpha = 4.68^\circ, M = 0.85, Re_C = 1.54 \times 10^6$). The movie is reproduced at 1/500 of real time, corresponding to the frame rate of 2,000 fps and the reproduction speed of 4 fps.

**ESM2:** Time-series $C_p'$ distributions obtained by the fast-response PSP ($\alpha = 4.68^\circ, M = 0.85, Re_C = 1.54 \times 10^6$). The movie is reproduced at 1/500 of real time, corresponding to the frame rate of 2,000 fps and the reproduction speed of 4 fps.

**ESM3:** Time-series $C_p$ distributions obtained by the fast-response PSP ($\alpha = 6.00^\circ, M = 0.85, Re_C = 1.54 \times 10^6$). The movie is reproduced at 1/500 of real time, corresponding to the frame rate of 2,000 fps and the reproduction speed of 4 fps.

**ESM4:** Time-series $C_p'$ distributions obtained by the fast-response PSP ($\alpha = 6.00^\circ, M = 0.85, Re_C = 1.54 \times 10^6$). The movie is reproduced at 1/500 of real time, corresponding to the frame rate of 2,000 fps and the reproduction speed of 4 fps.

**ESM5:** Time-series $C_p$ distributions obtained by the fast-response PSP ($\alpha = 6.52^\circ, M = 0.85, Re_C = 1.54 \times 10^6$). The movie is reproduced at 1/500 of real time, corresponding to the frame rate of 2,000 fps and the reproduction speed of 4 fps.

**ESM6:** Time-series $C_p'$ distributions obtained by the fast-response PSP ($\alpha = 6.52^\circ, M = 0.85, Re_C = 1.54 \times 10^6$). The movie is reproduced at 1/500 of real time, corresponding to the frame rate of 2,000 fps and the reproduction speed of 4 fps.