

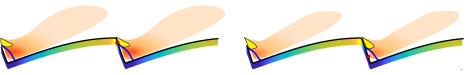
Low-angle dunes (mean lee side angle < ca. 10°)



Intermediate-angle dunes (mean lee side angle ca. 10° - 17°



High-angle dunes (mean lee side angle > ca. 20°)



vupper limit flow separation zone

no flow separation, except if a steep portion (slope > 20°) is found close to the trough

a small turbulent wake starts over the steepest lee side portion

a shear layer follows the lee side shape, longer for maximum angles close to trough than the crest

a flow separation is often (but not always) found over the trough

a larger turbulent wake than over low-angle dunes, independent of maximum slope position

a shear layer, thicker but shorter than over low-angle dunes

=> need for time-resolved characterisation of flow separation and turbulent wake

a flow separation starts at the brink point and extends until after the trough

a large turbulent wake, strongest and largest for maximum angles close to the crest

a shear layer detaches from the lee side after the crest