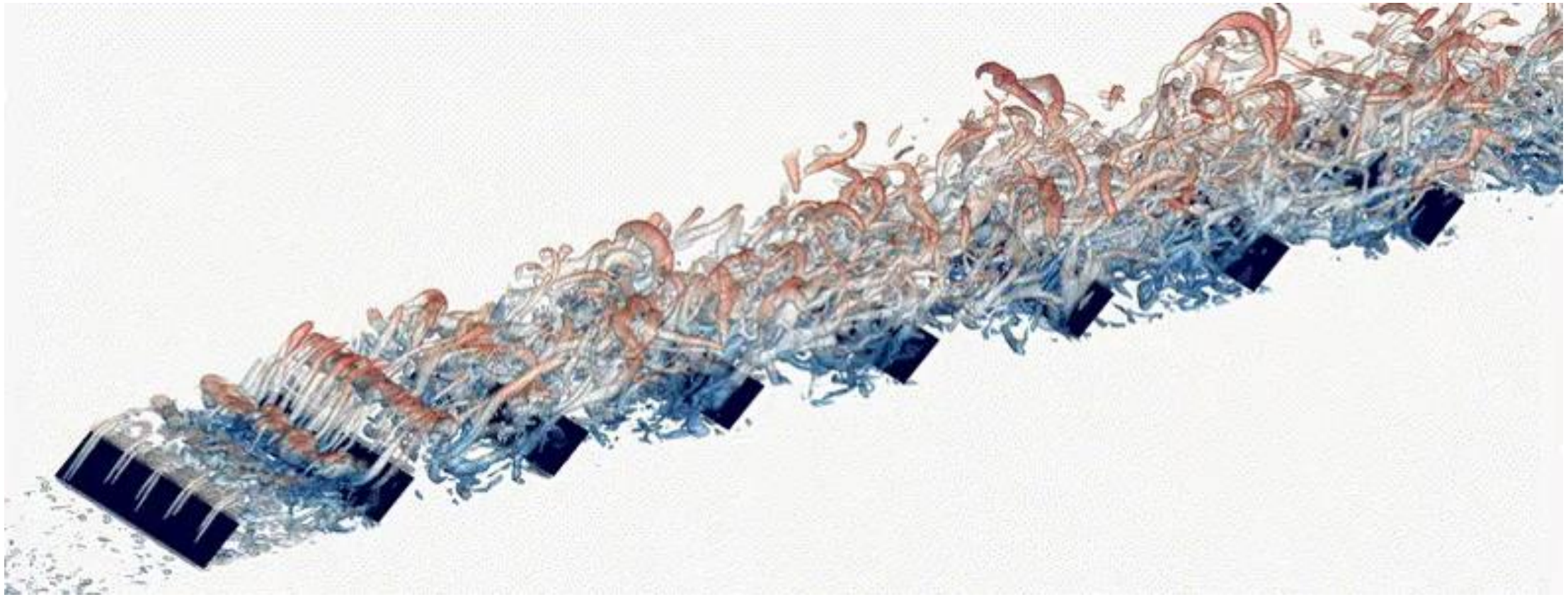
Large-Eddy Simulation of solar PV farms

Dr P Ouro & Dr J-L Suarez

Supergen ORE hub Flex Fund Research Stay

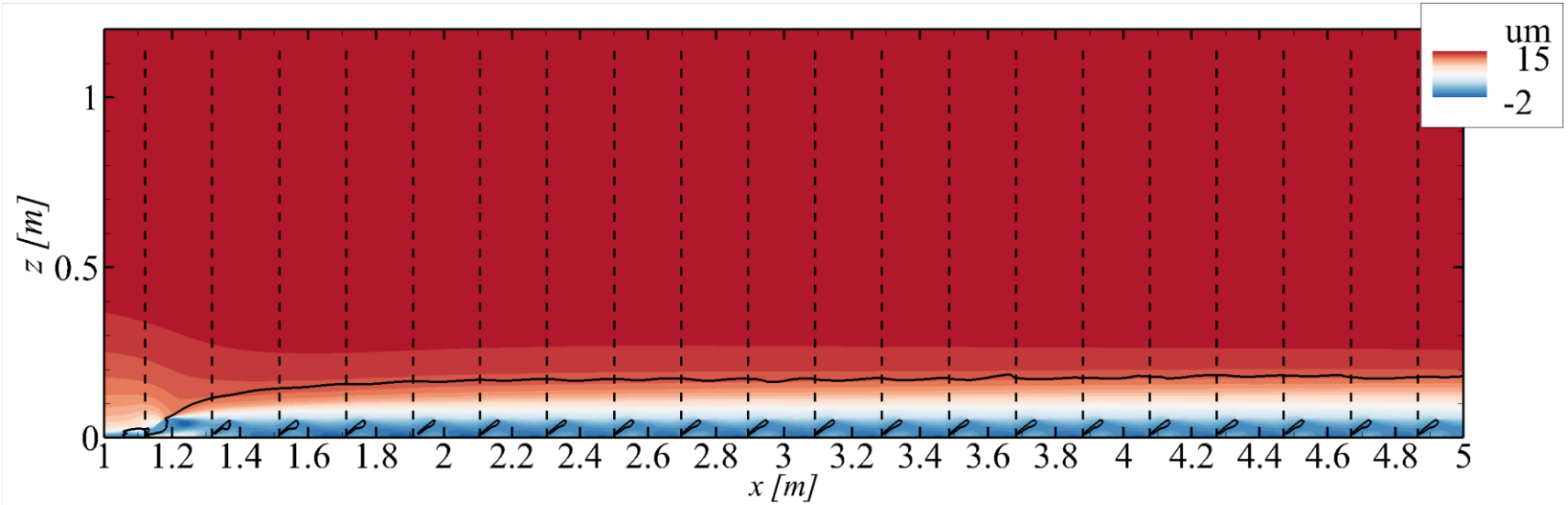
2D – BIDIMENSIONAL FLOW

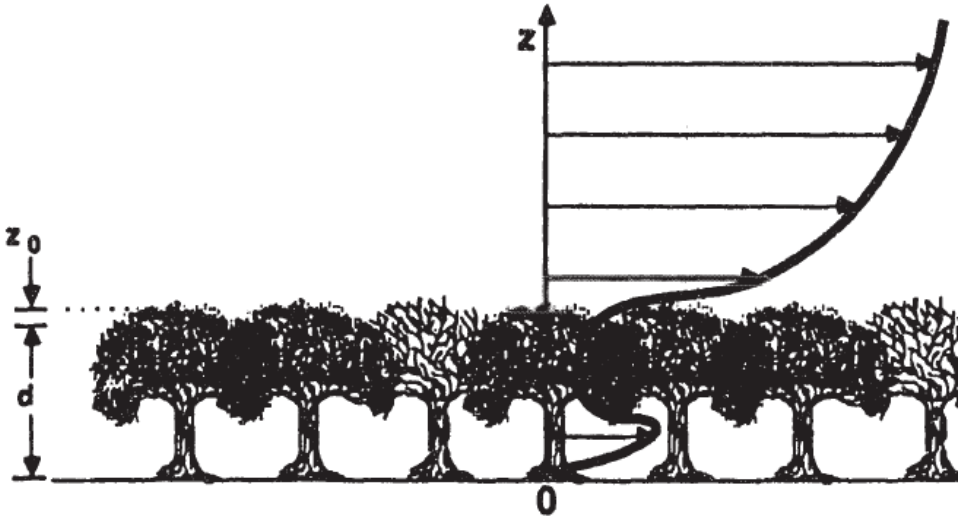
LARGE-EDDY SIMULATION



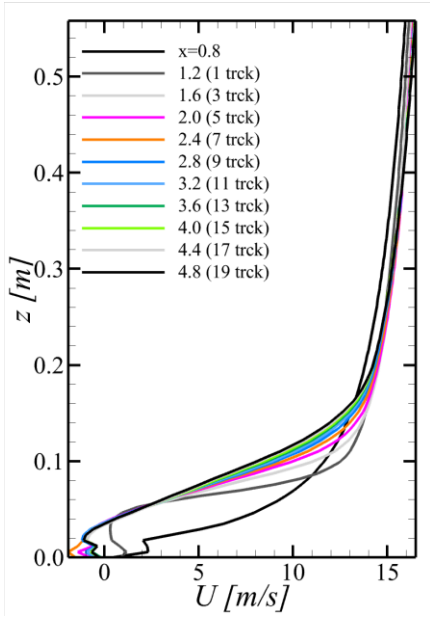
LES RESULTS

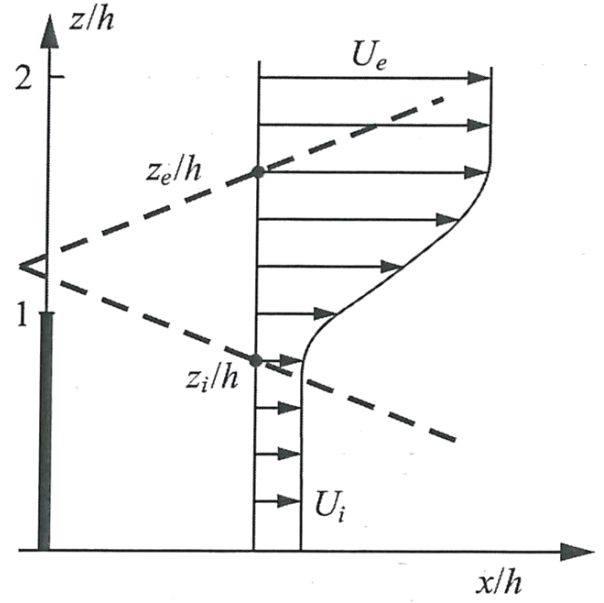
SCALE 1:35





An introduction to Boundary Layer Meteorology (Roland Stull)





LES RESULTS

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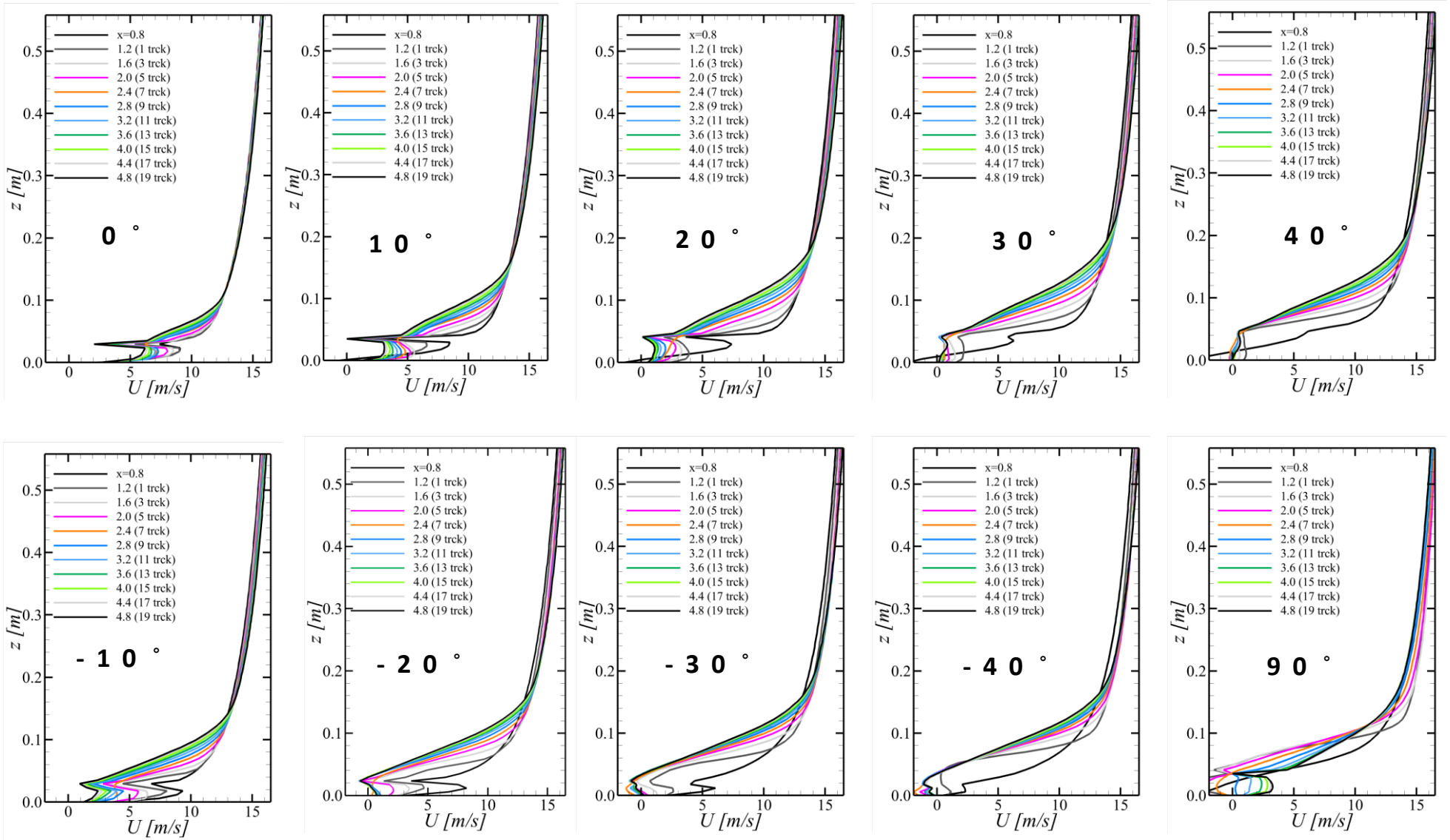
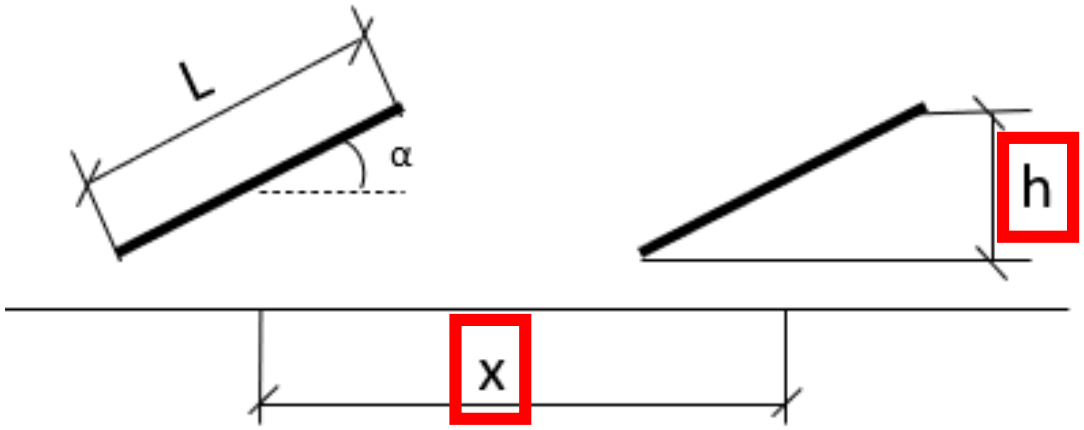
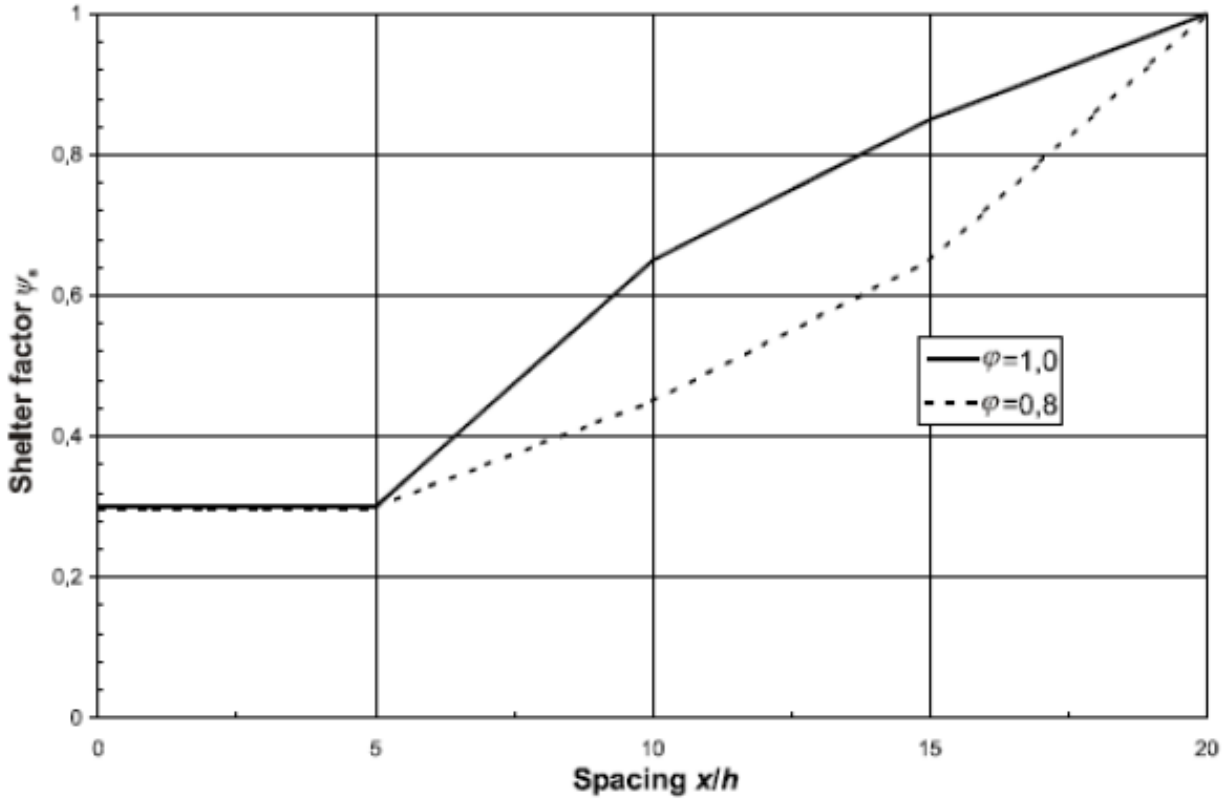


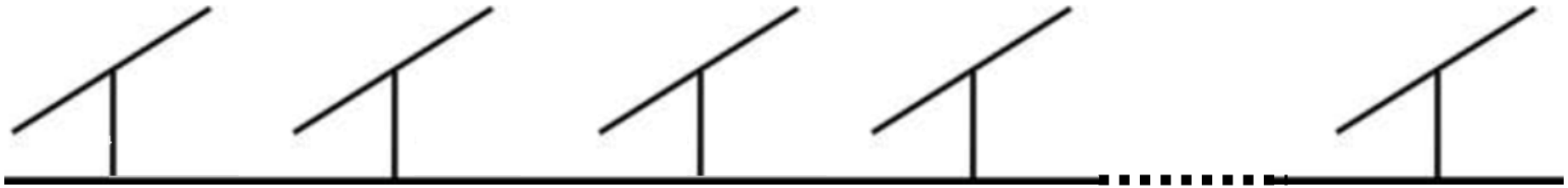
SHELTER FACTOR CALCULATION FOR SOLAR PV TRACKERS





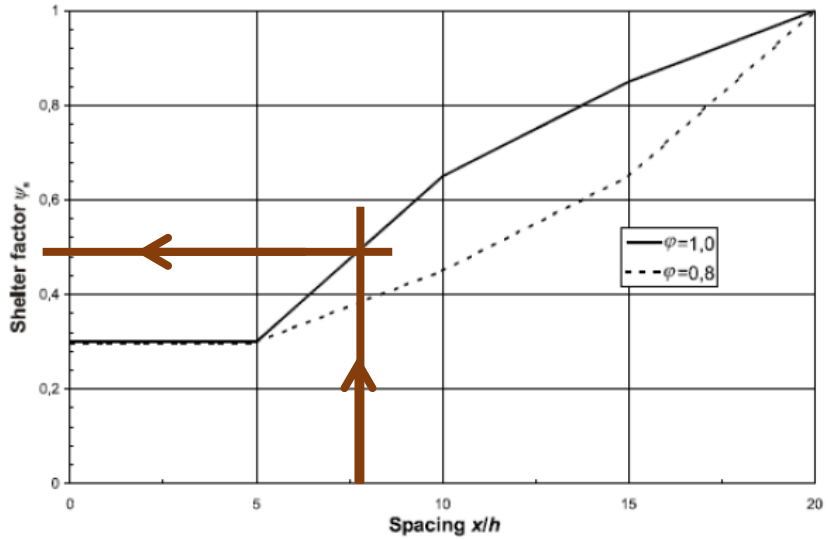
SHELTER FACTOR CALCULATION FOR SOLAR PV TRACKERS

$\psi_s^0 = 1$ $\psi_s^1 = \psi_s$ $\psi_s^2 = \psi_s \times \psi_s$ $\psi_s^3 = \psi_s \times \psi_s \times \psi_s$ ψ_s^{n-1}



1 2 3 4 n

ψ_s

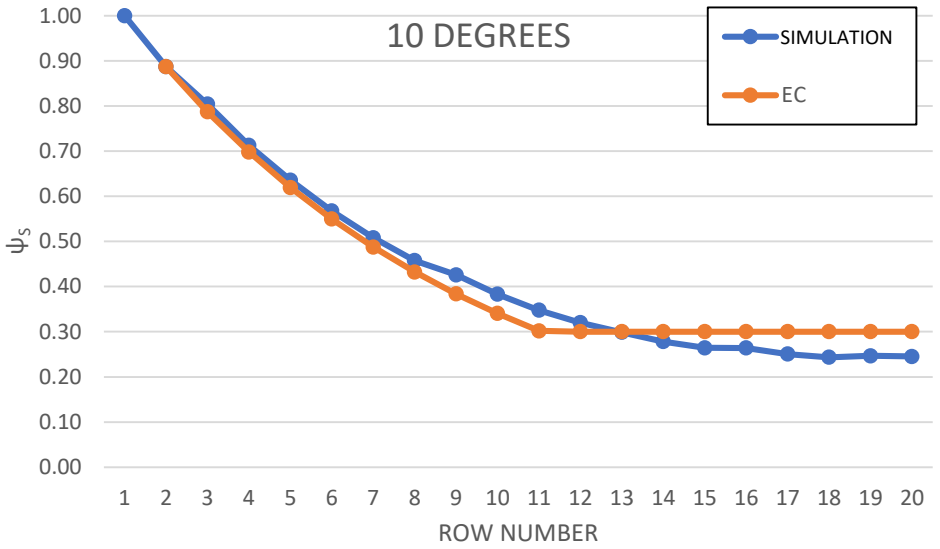


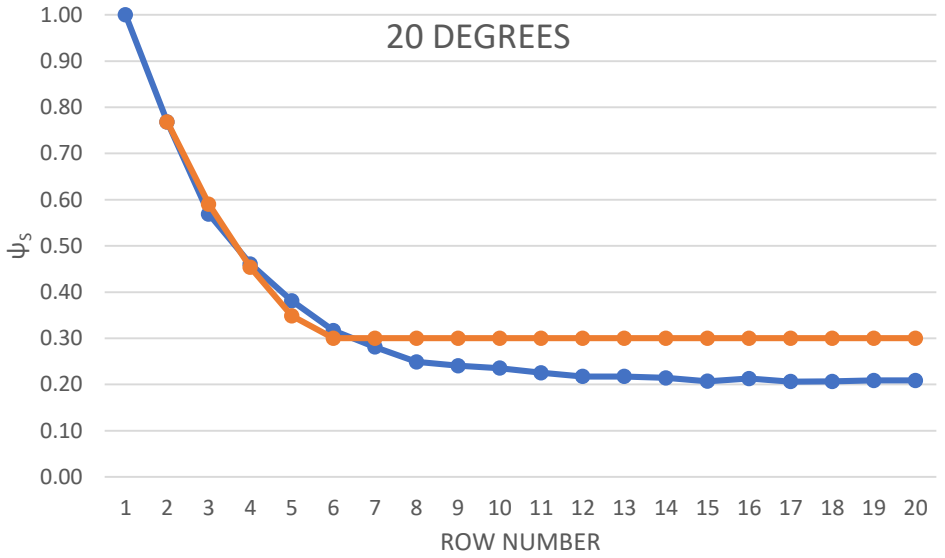
Condition:

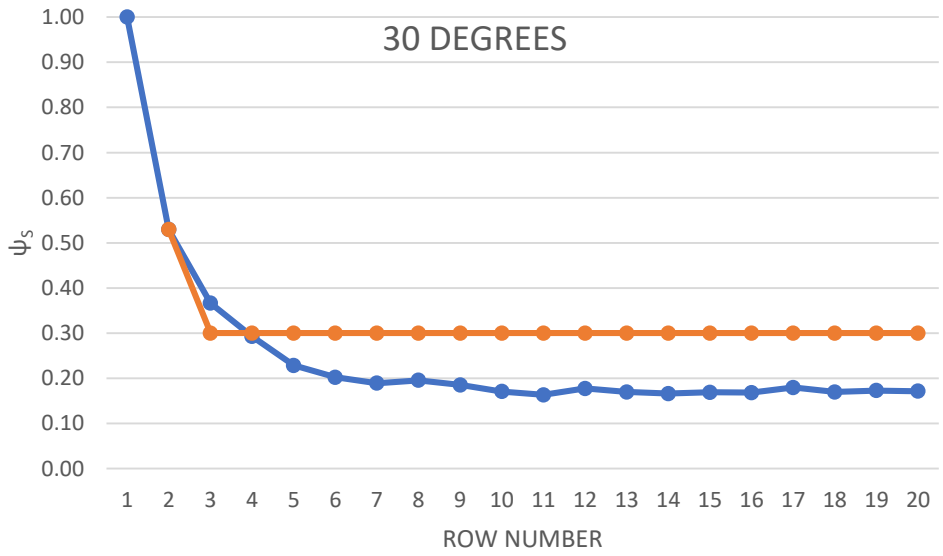
$$\psi_s^j \geq 0,3$$

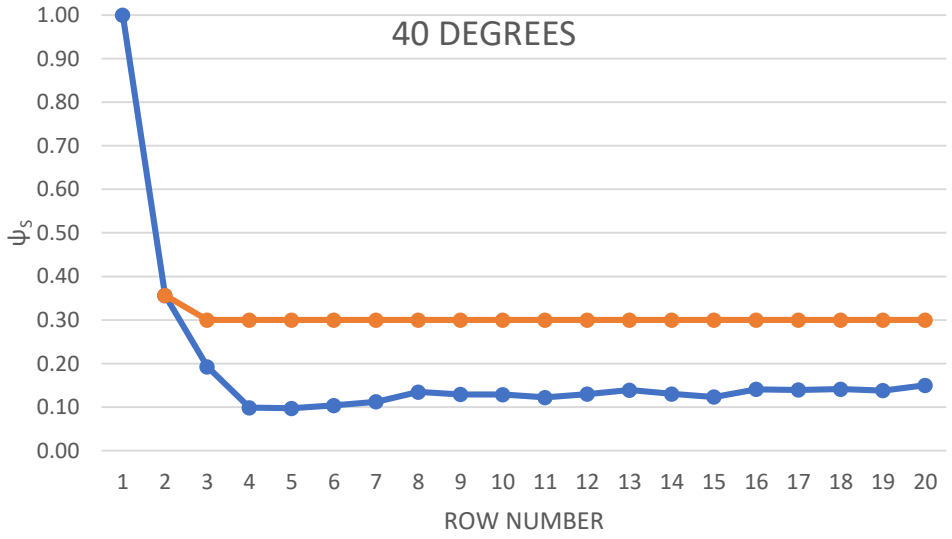
LES vs EUROCODE

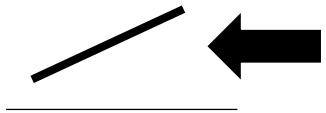
RESULTS







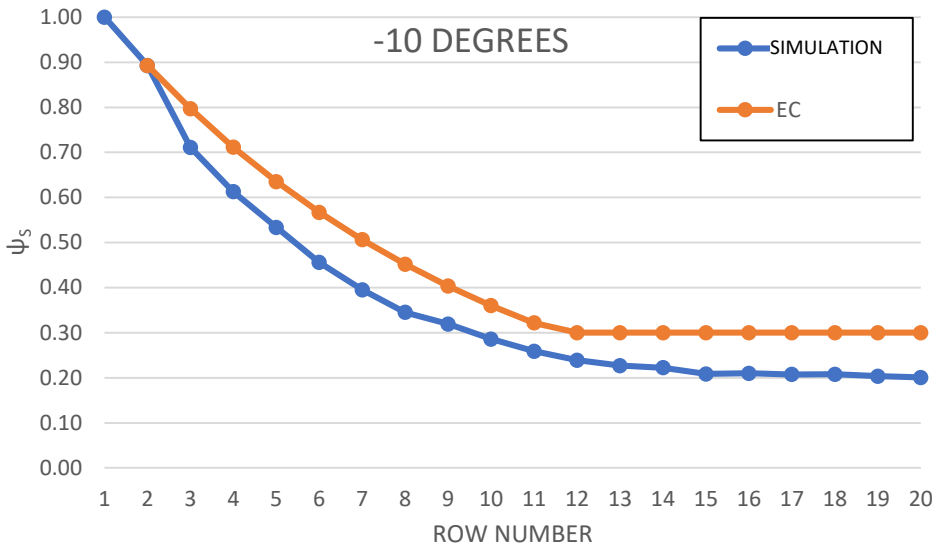


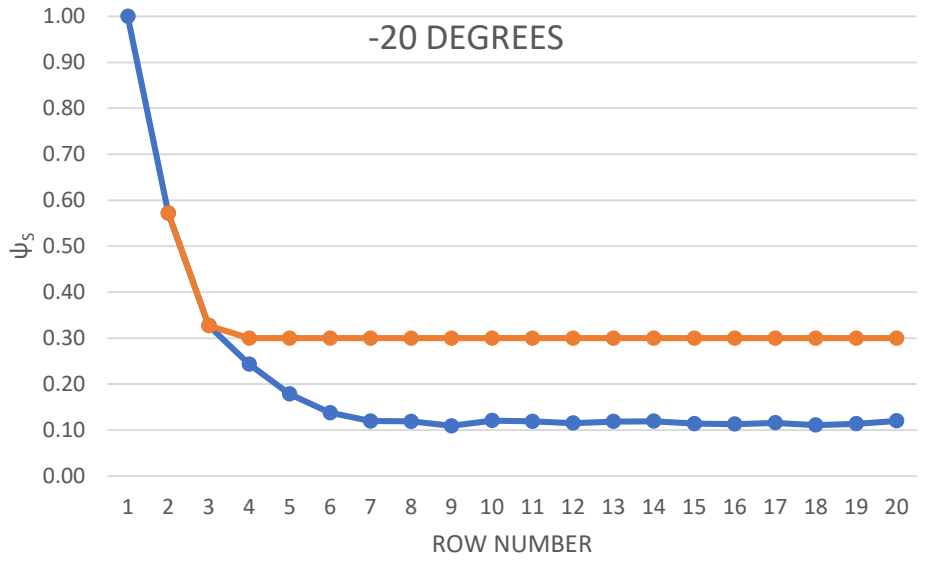


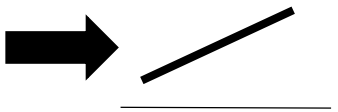
L= 2.500 mm
X= 6.800 mm

LES vs EUROCODE

RESULTS







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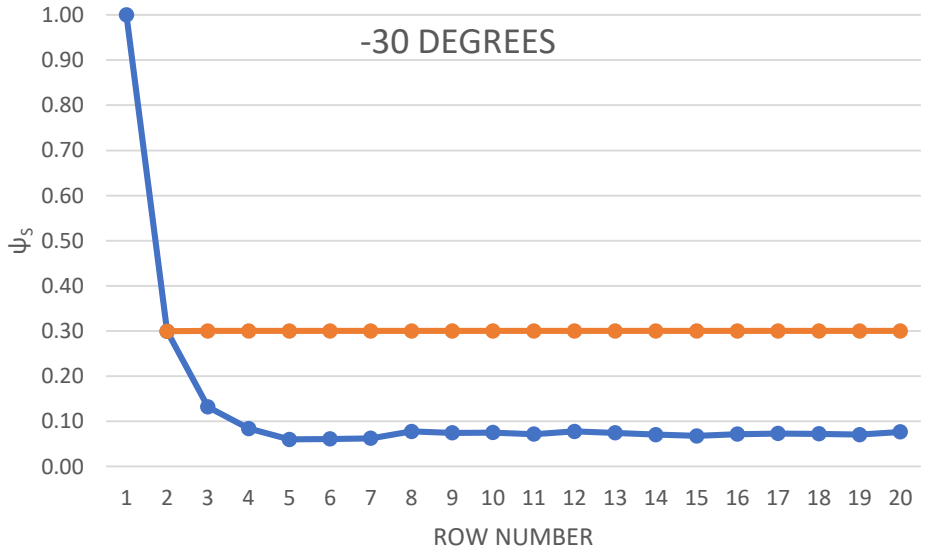
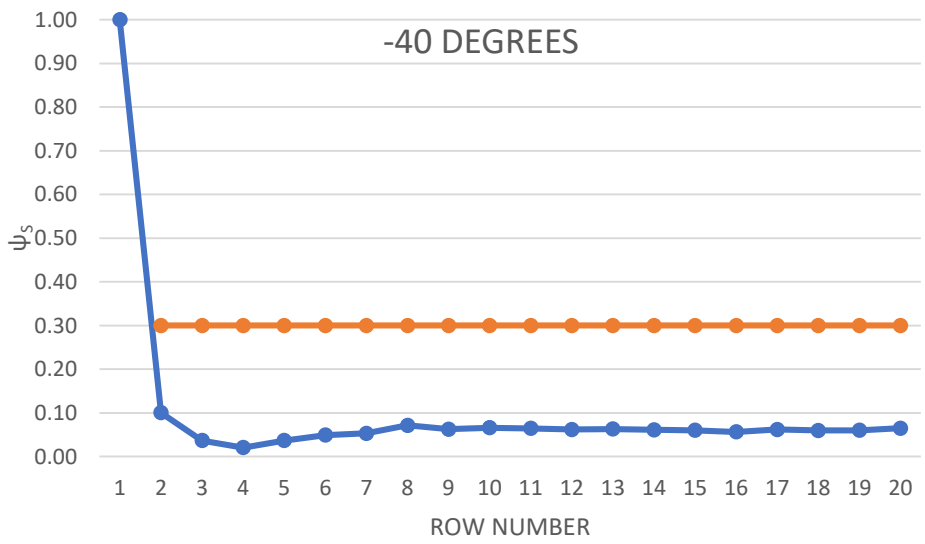
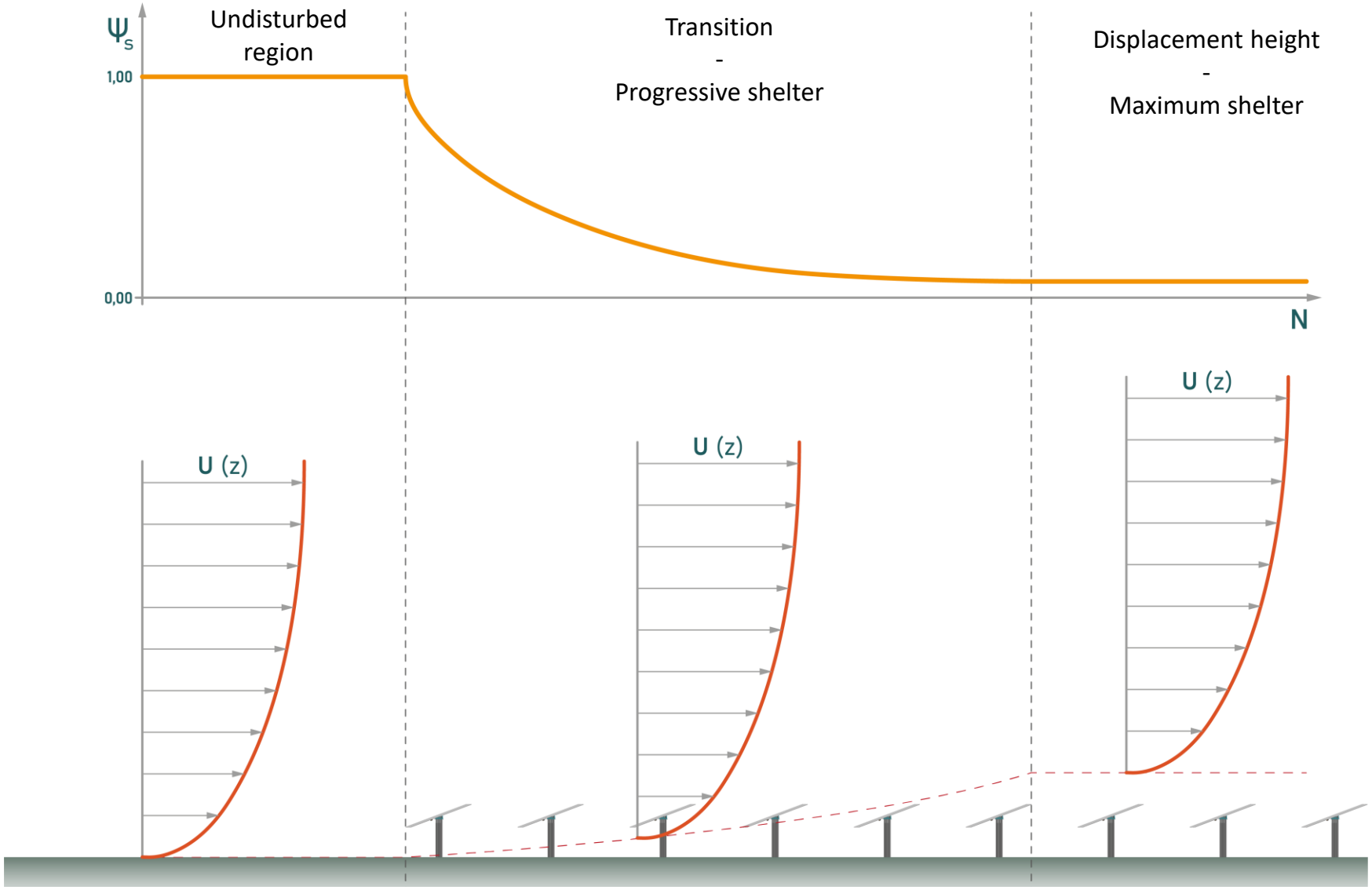
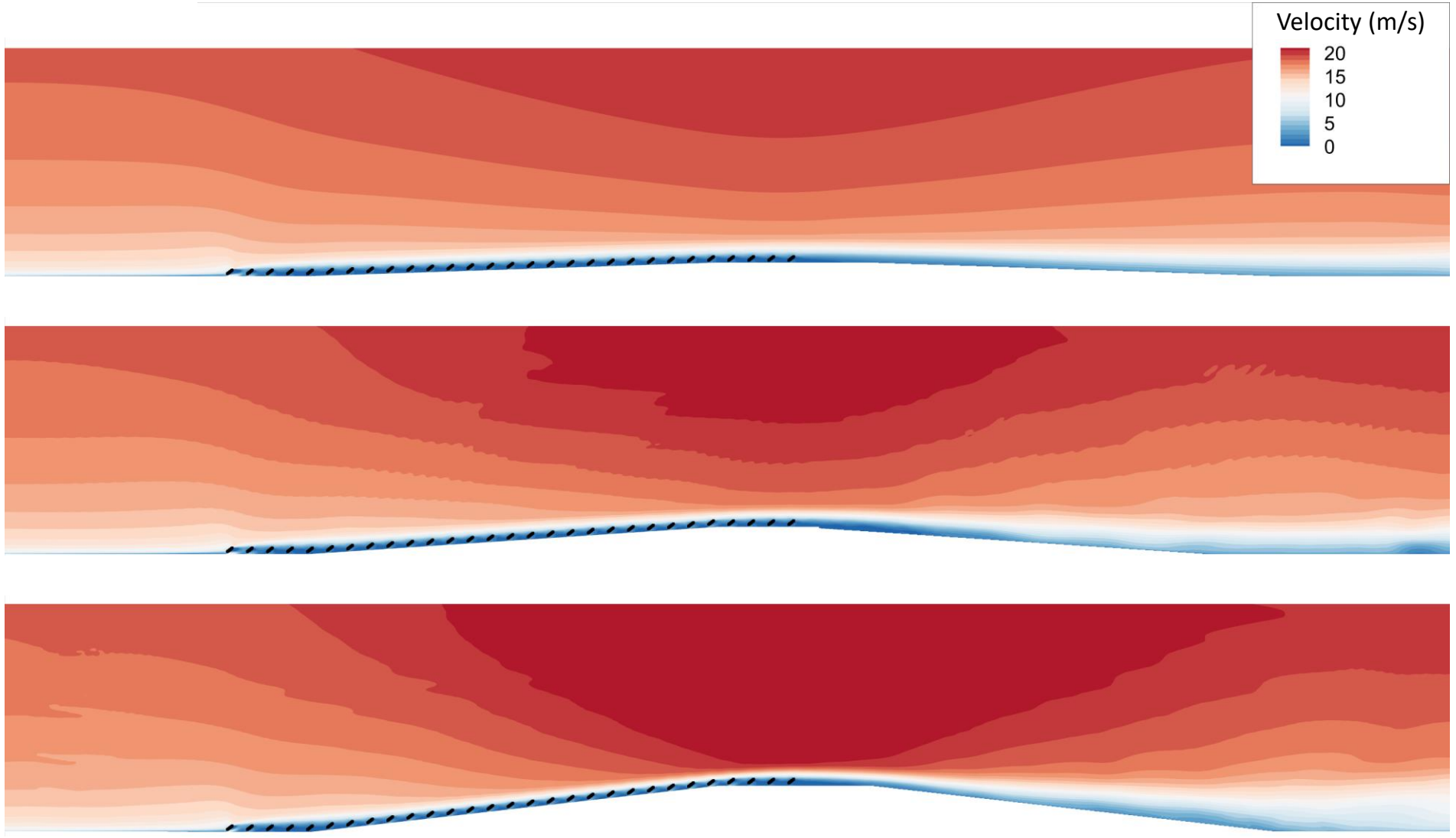




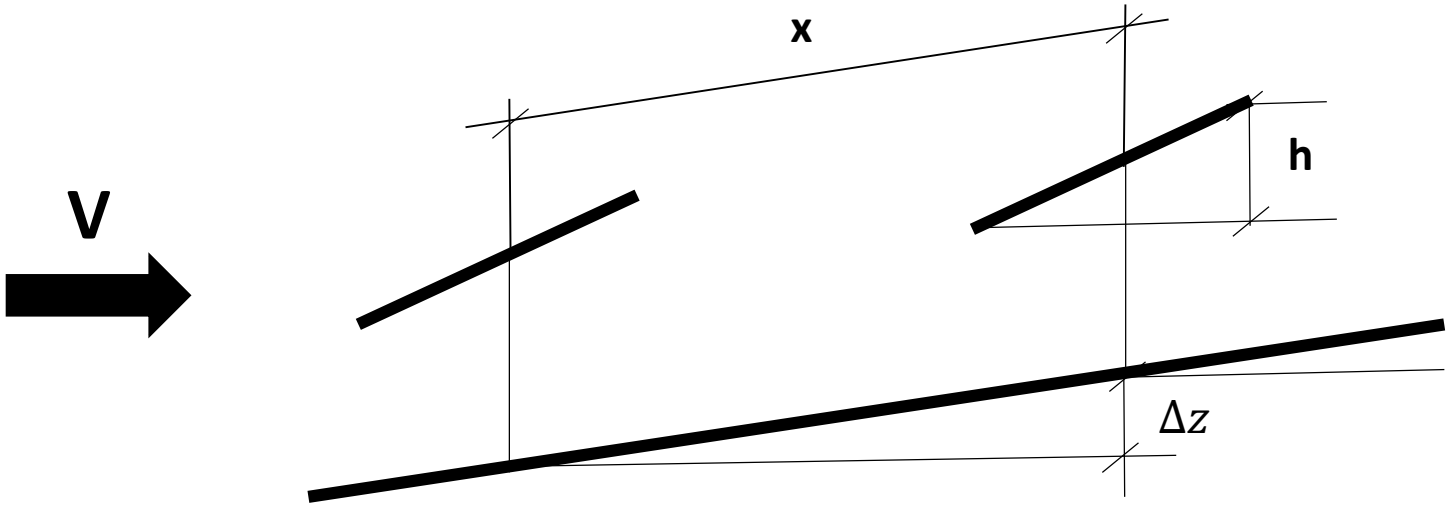
SHELTER FACTOR

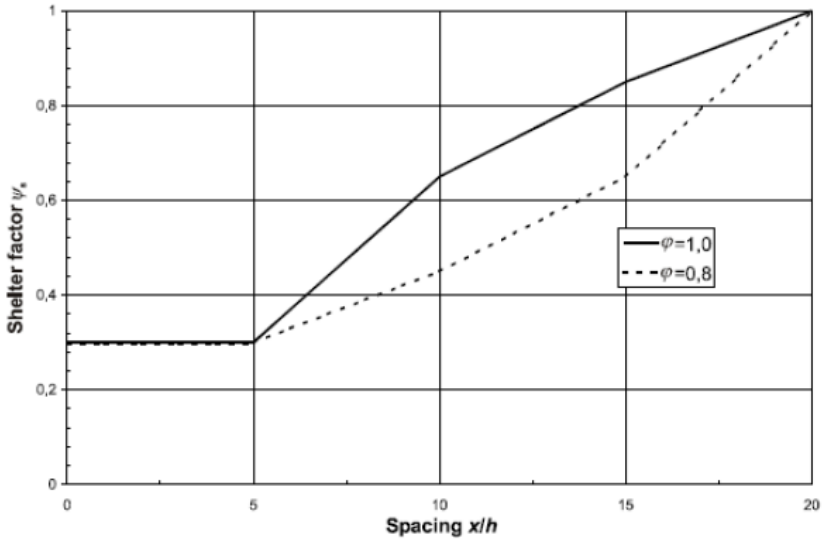


ARRAYS OVER HILLS



SHELTER FACTOR IN SLOPES



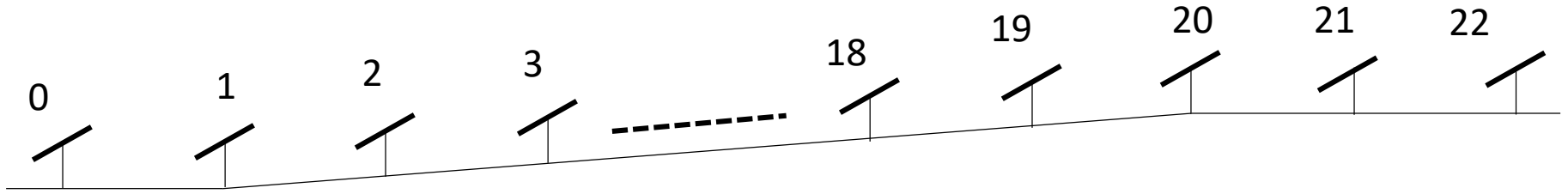


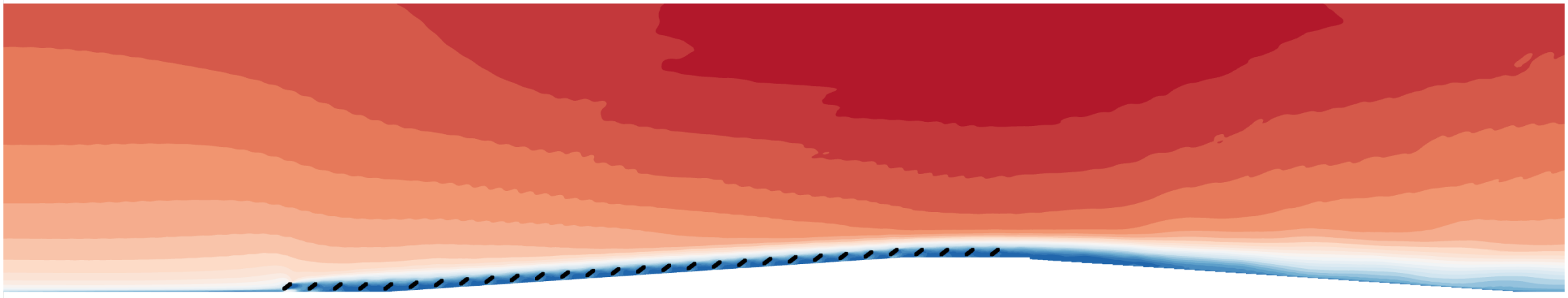
$$\psi_s^* = \frac{\psi_s \times (h - \Delta z) + \Delta z}{h}$$

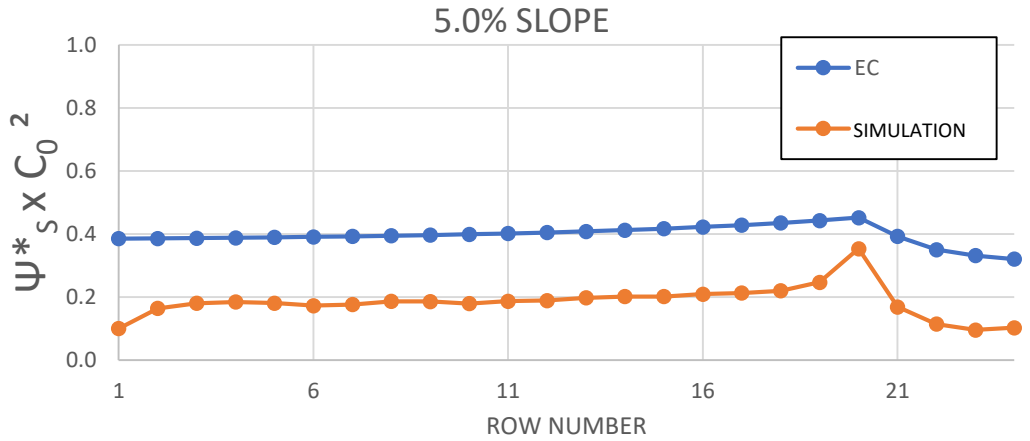
Condition:

$$\psi_s^j \geq \frac{0{,}3 \times (h - \Delta z) + \Delta z}{h}$$

SHELTER FACTOR IN SLOPES







SIMULATION vs EUROCODE