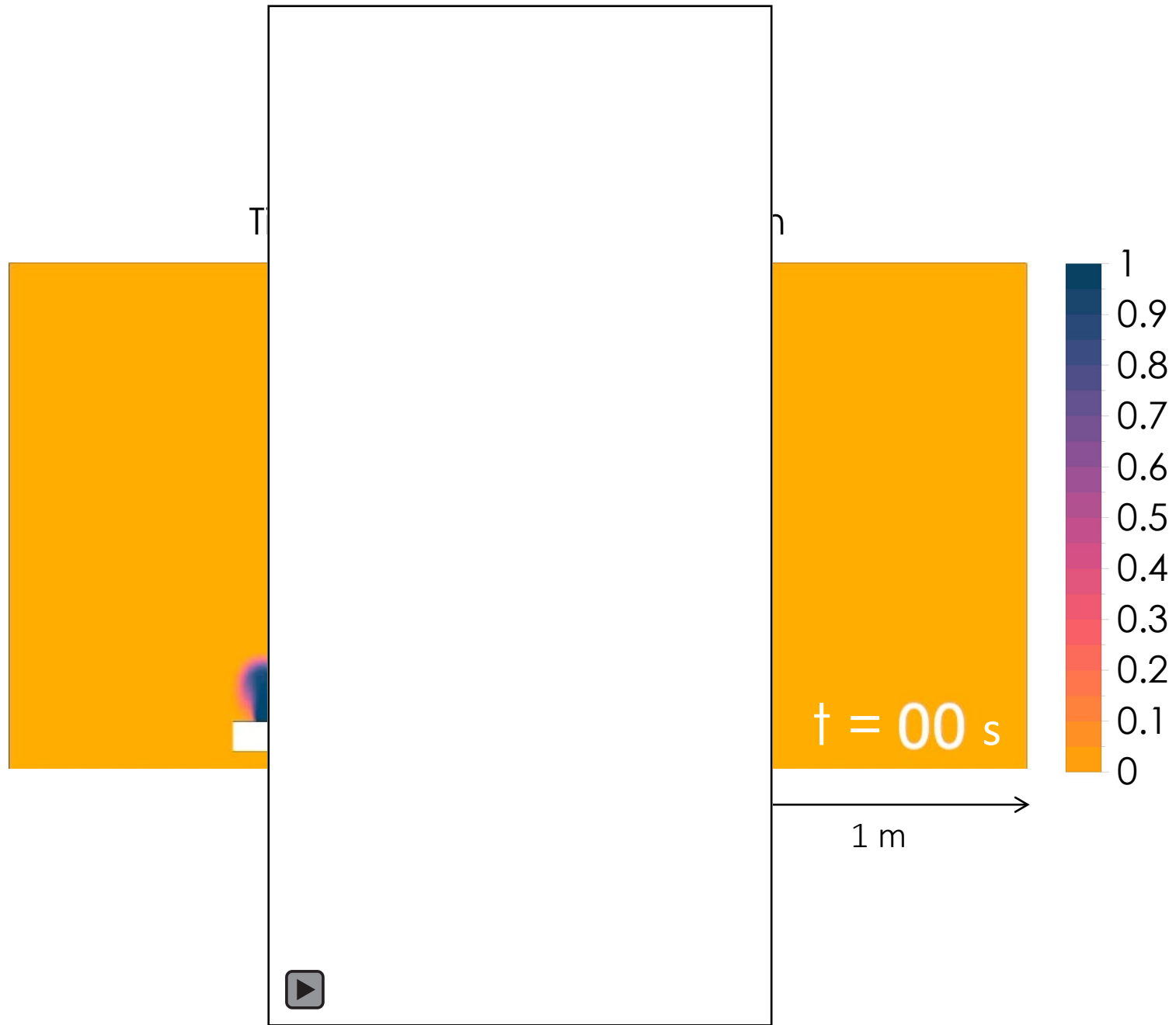


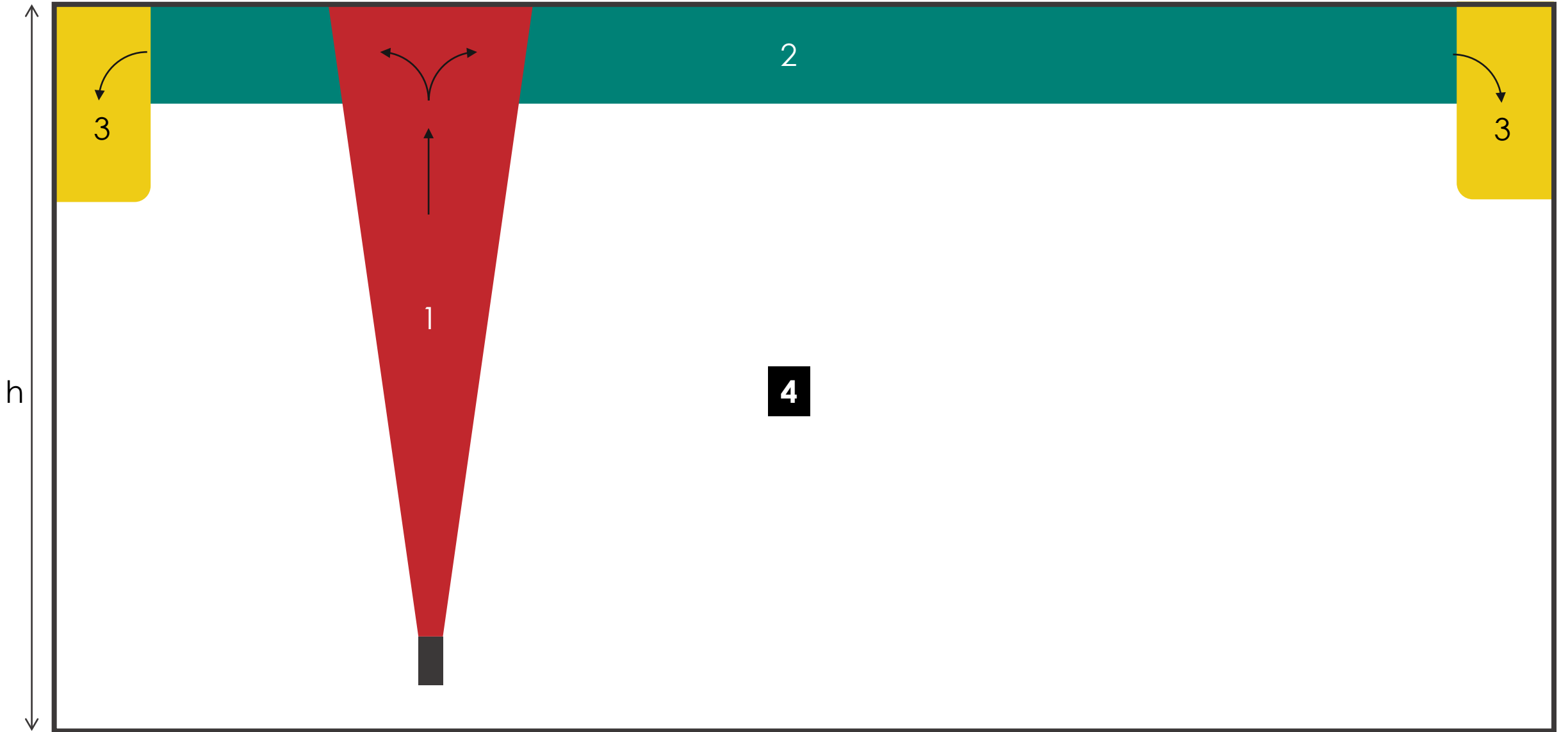
A non-dimensional surrogate model of stratified filling during indoor, plume-like hydrogen releases

With the financial support of the Energy Transition Fund



economie





DIMENSIONAL ANALYSIS



4 CFD MODELS



FIT CURVE TO DATA

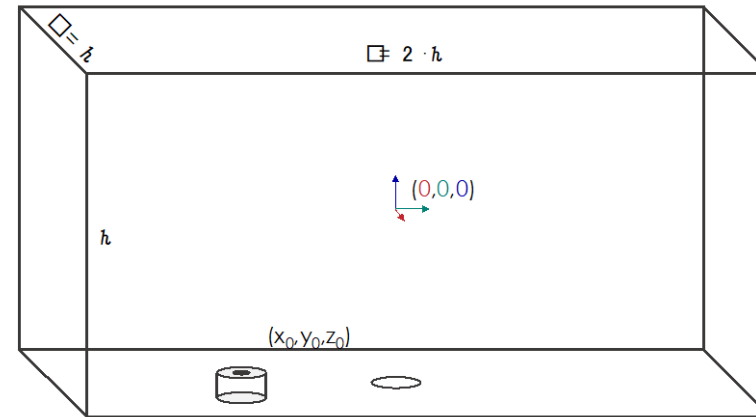
Buckingham's Pi-theorem

10 parameters $f(\chi_{h_2}, t, \dot{V}, h_0, h_d, l, w, h, \rho_0, \rho_a) = 0$

7 parameters $\psi\left(\chi_{h_2}, \frac{\dot{V} \cdot t}{h^3}, \frac{h_d}{h}, \frac{h_0}{h}, \frac{l}{h}, \frac{w}{h}, \frac{\rho_0}{\rho_a}\right) = 0$

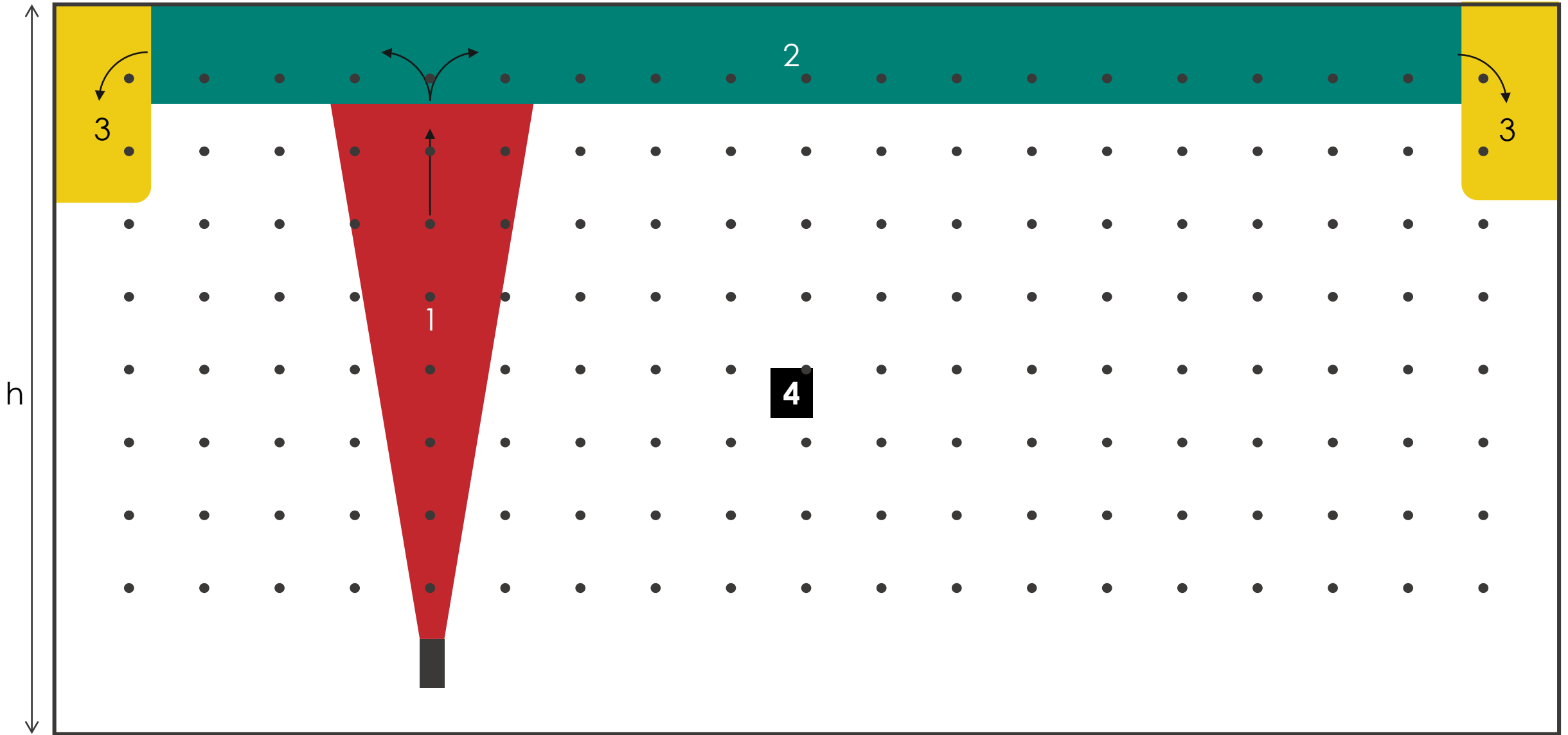
4 CFD models

Similar shape

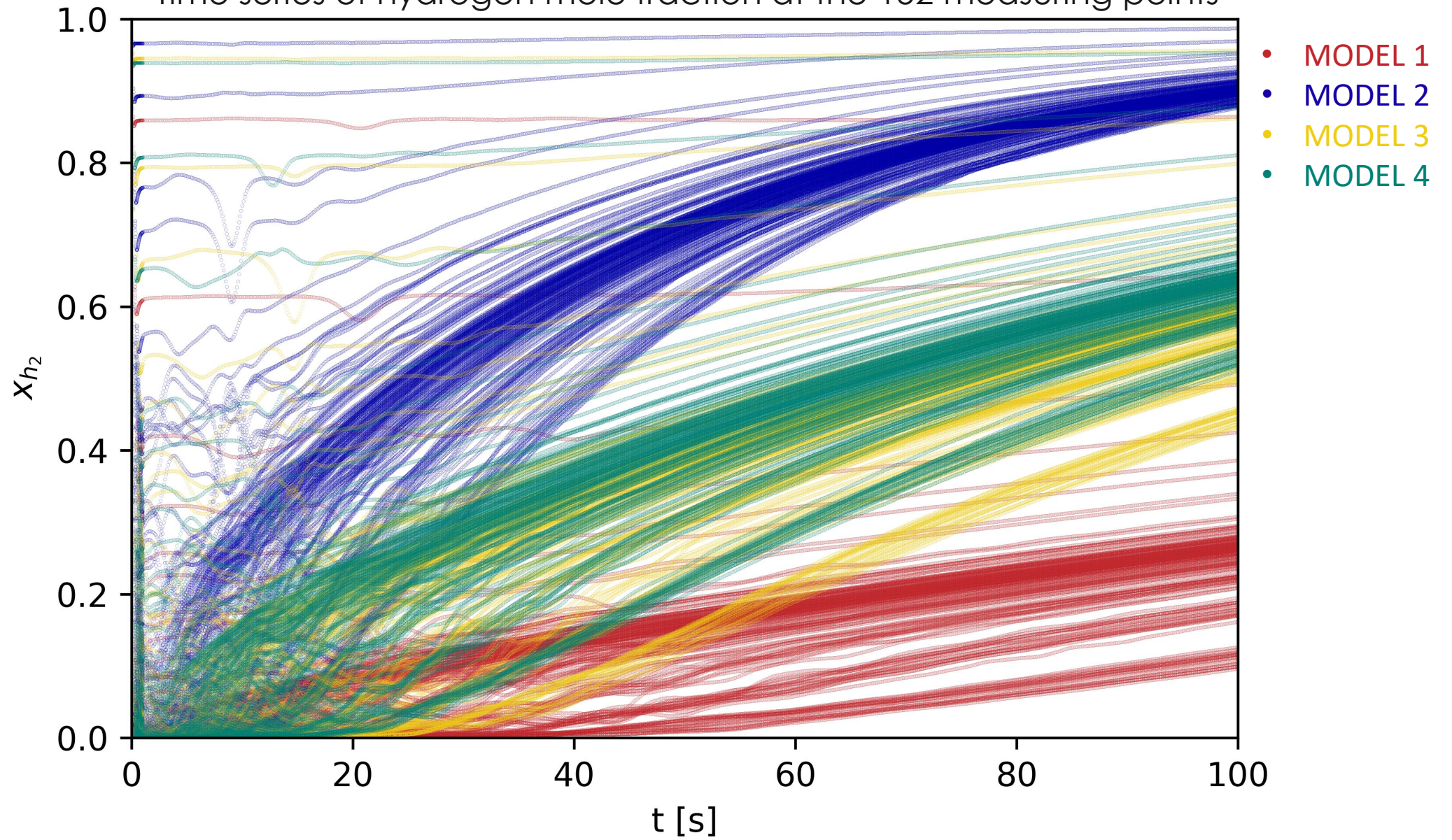


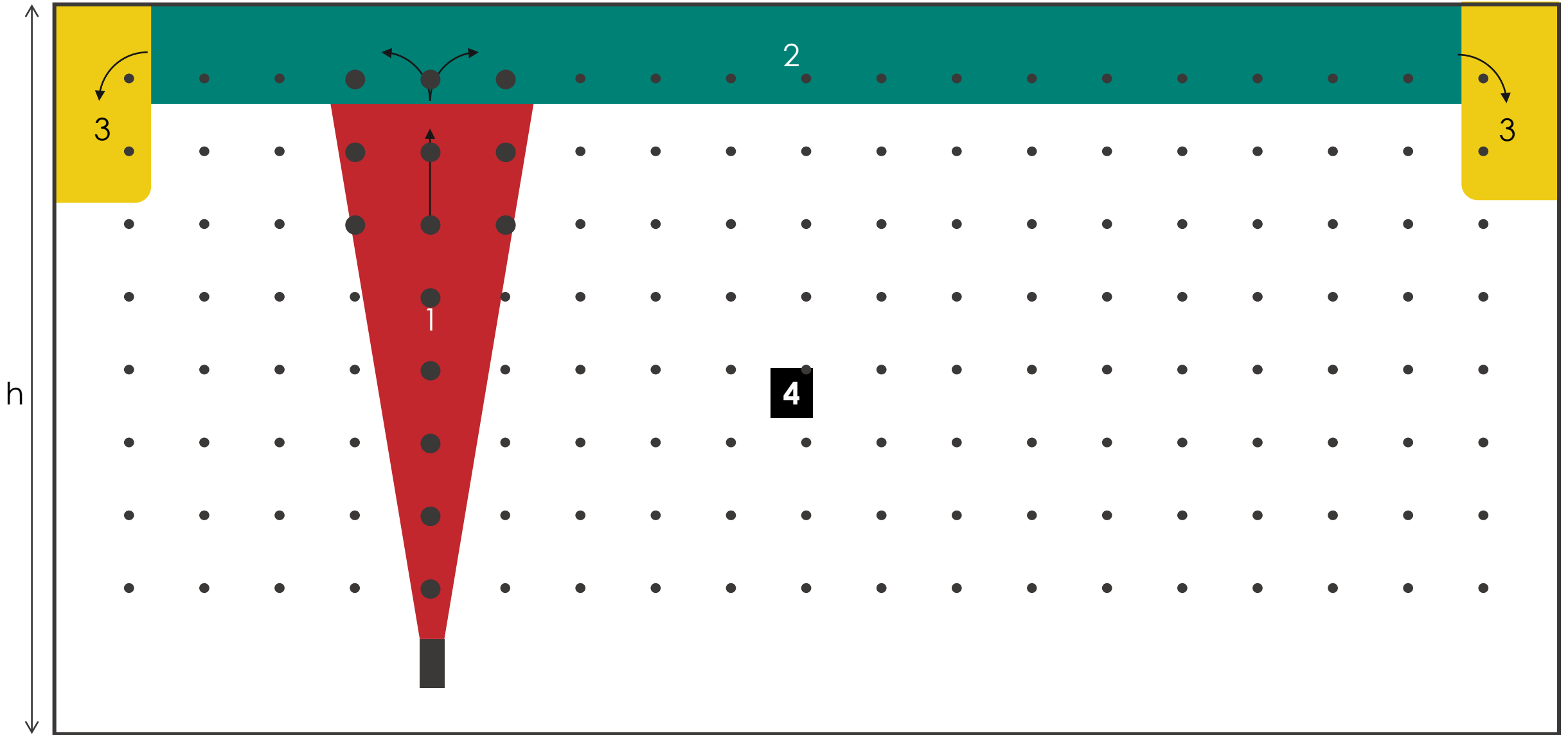
4 Samples

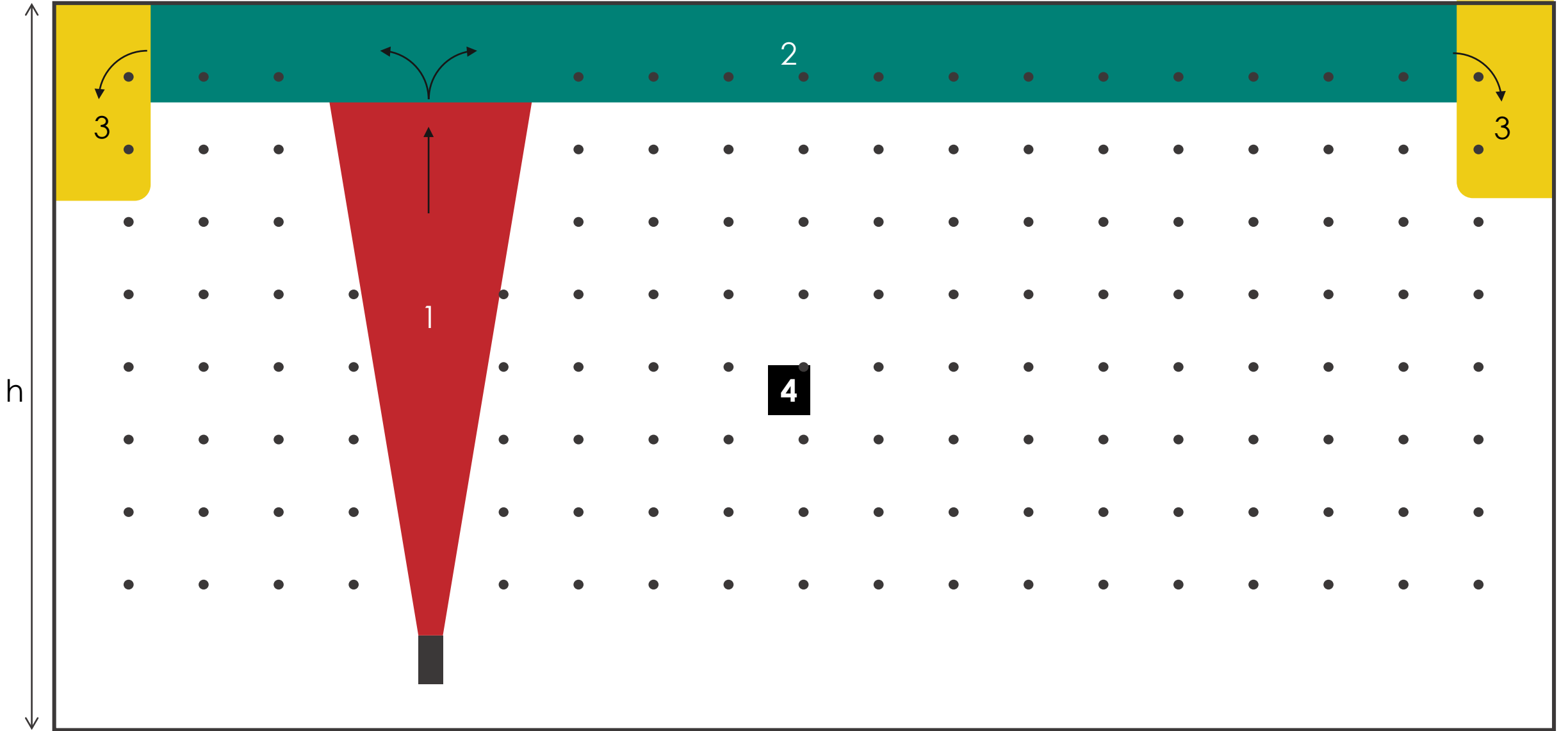
Index	$V [m^3]$	$\dot{V} [m^3/s]$
1	9.8	0.02
2	3.2	0.05
3	12.6	0.08
4	4.7	0.03



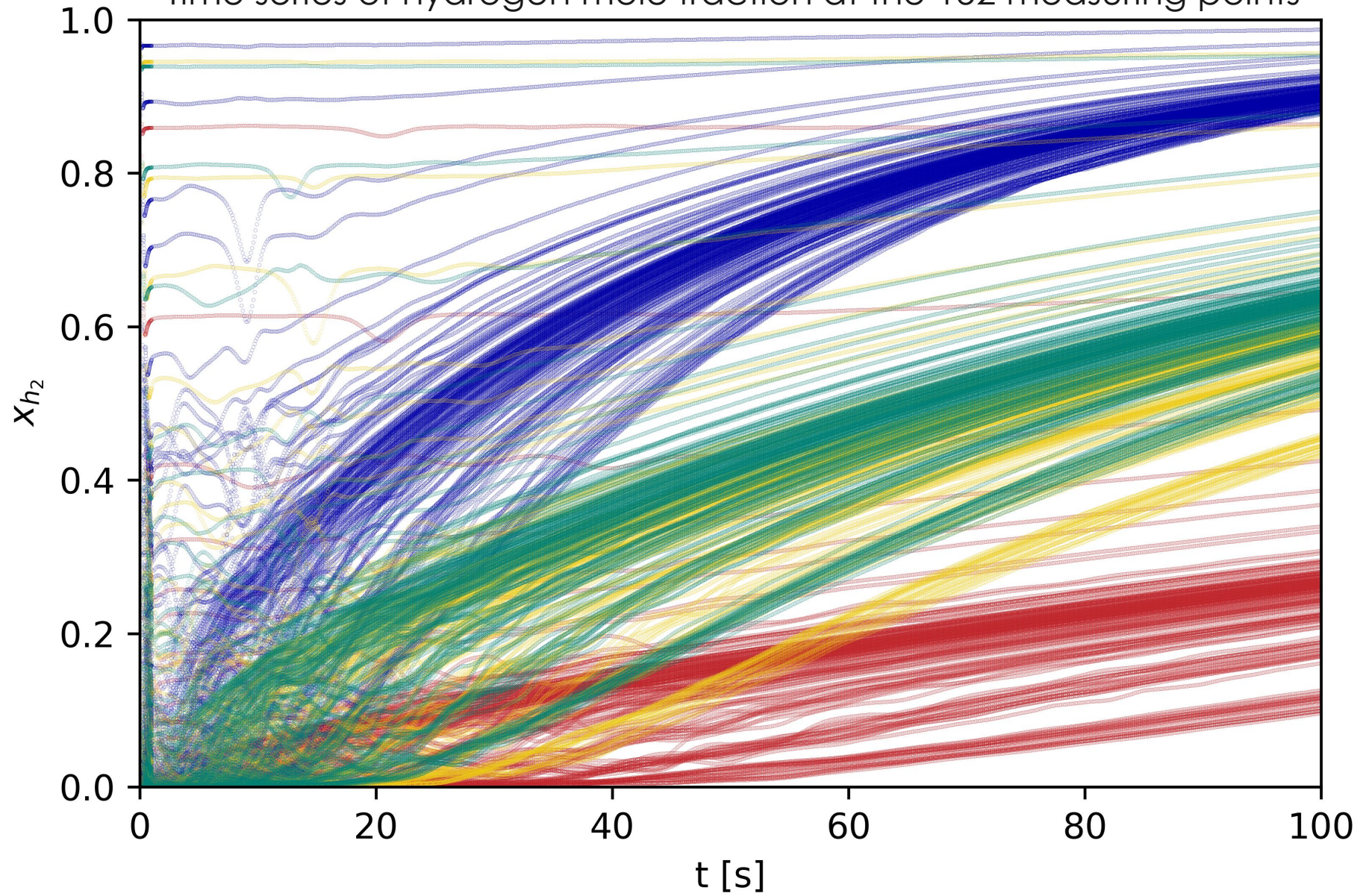
Time series of hydrogen mole fraction at the 152 measuring points



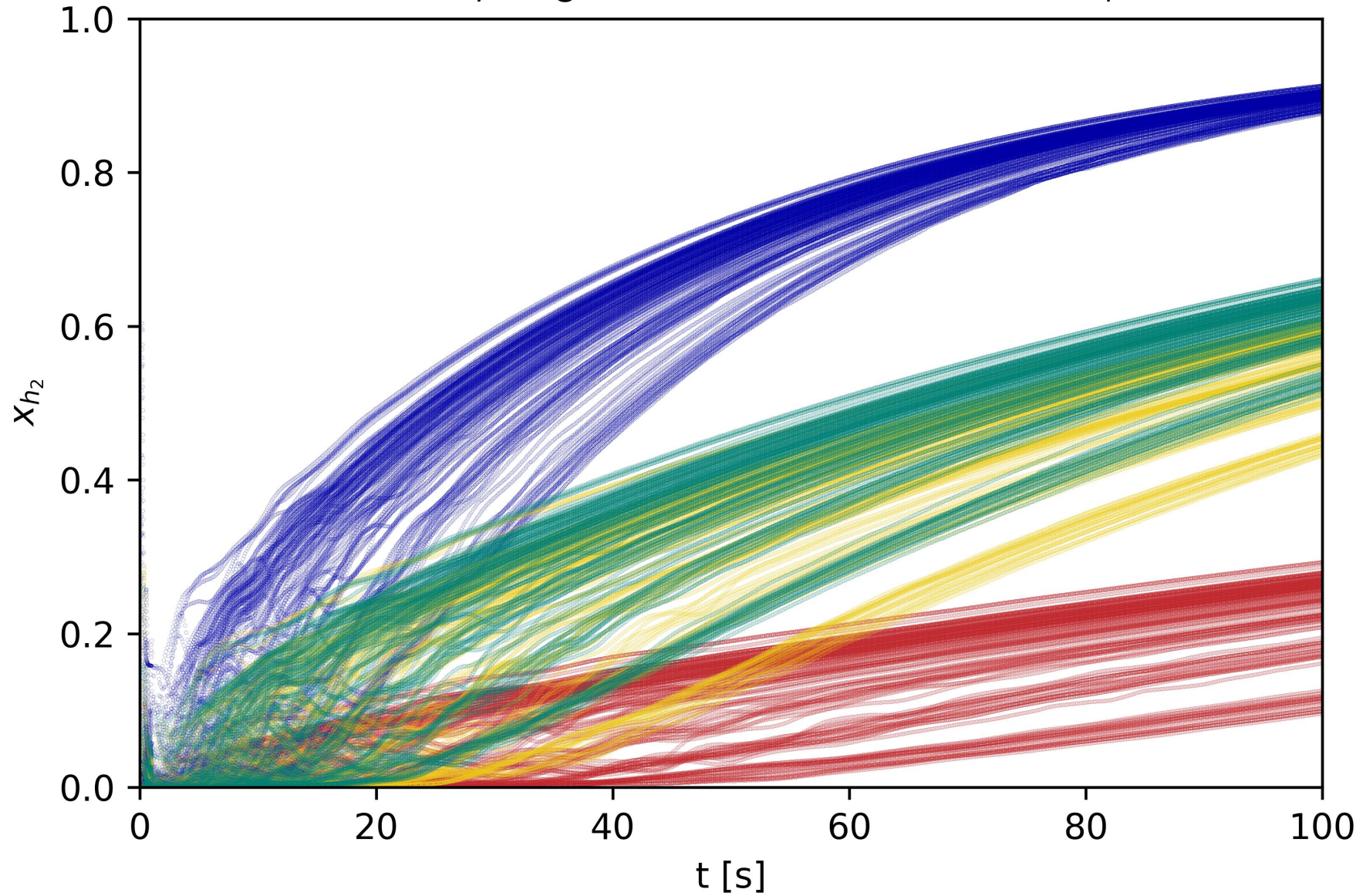




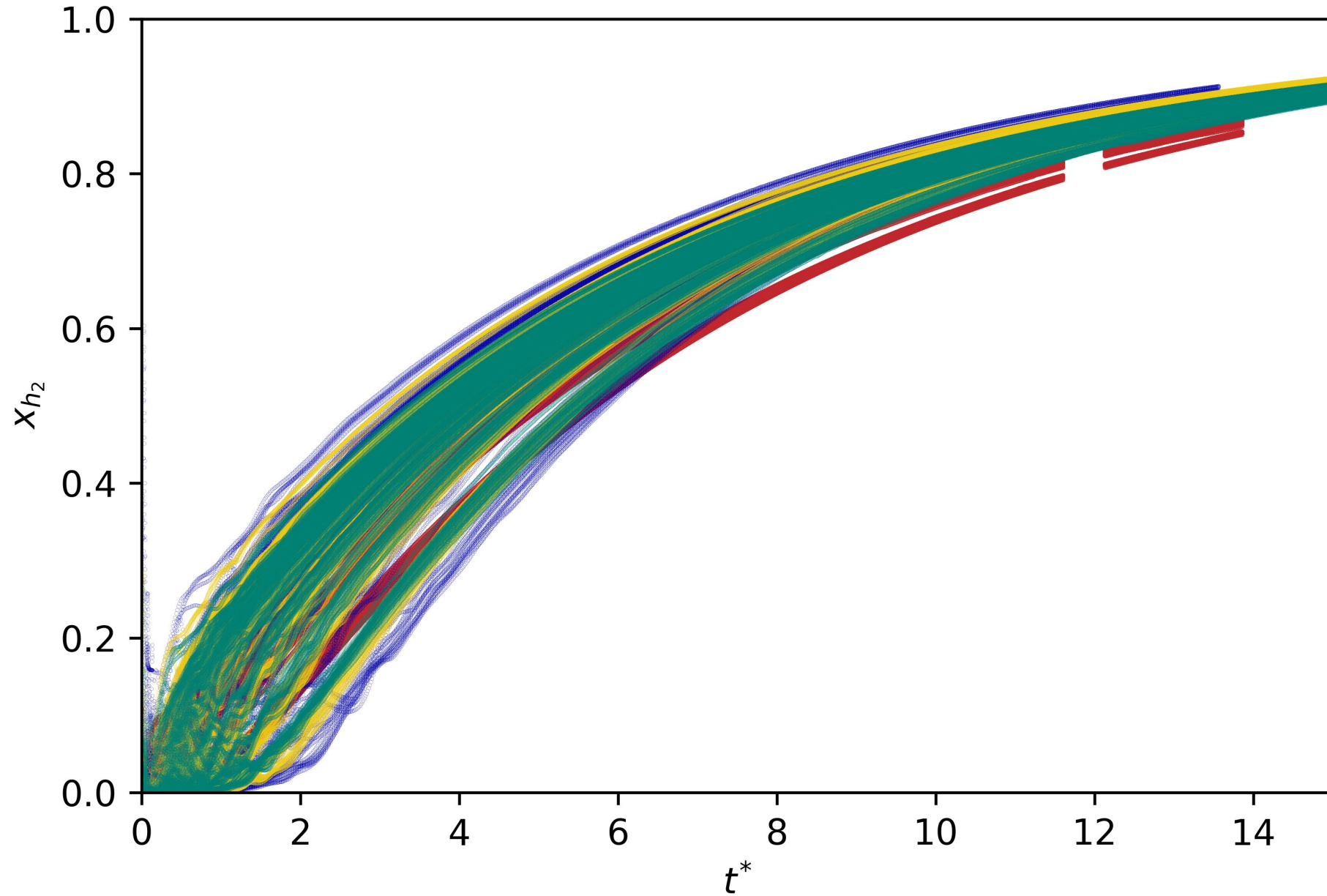
Time series of hydrogen mole fraction at the 152 measuring points



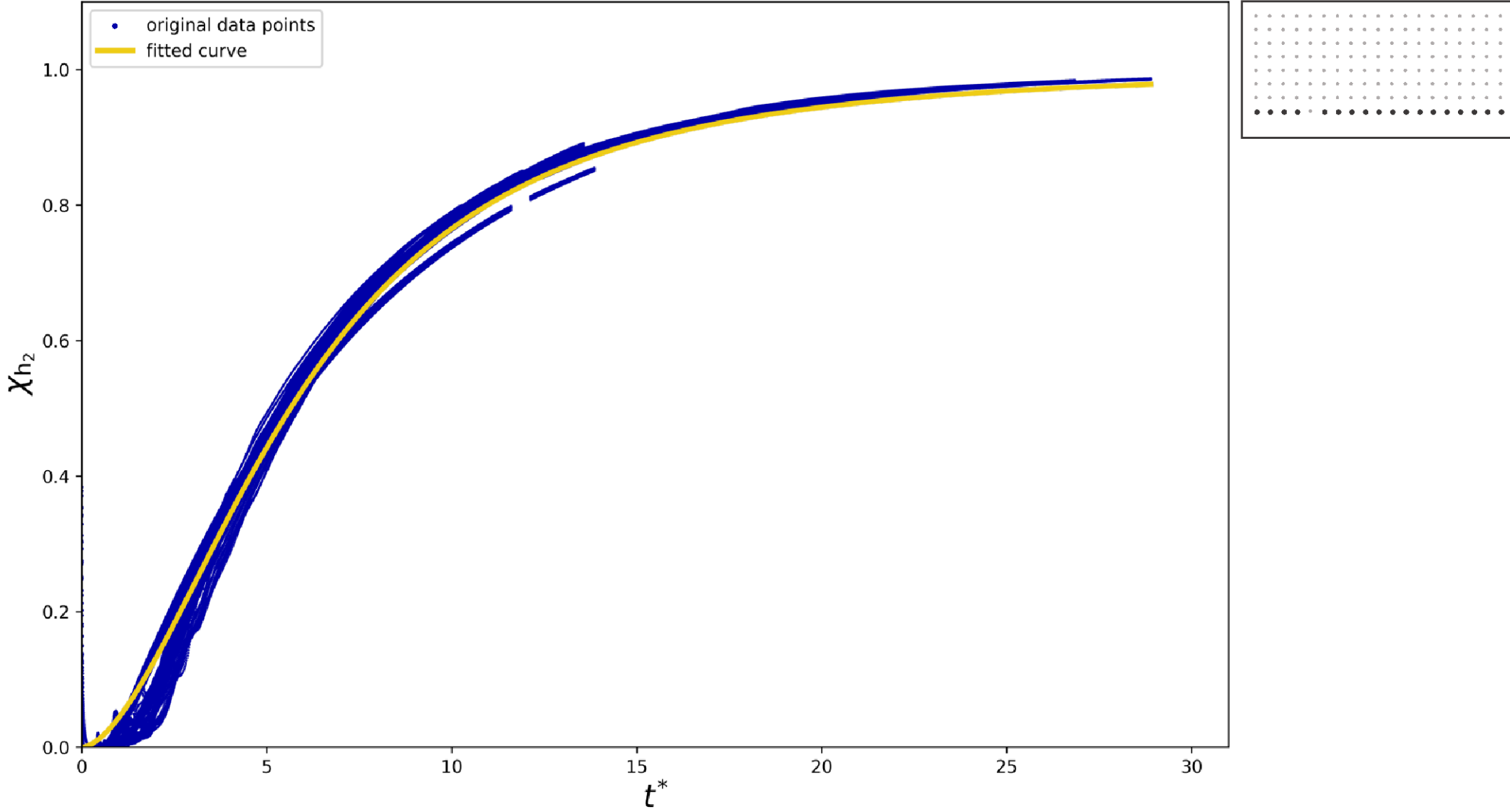
Time series of hydrogen mole fraction far from the plume



Non dimensional time series of hydrogen mole fraction far from the plume



Non dimensional time series of hydrogen mole fraction at $h_d/h = 1/5$

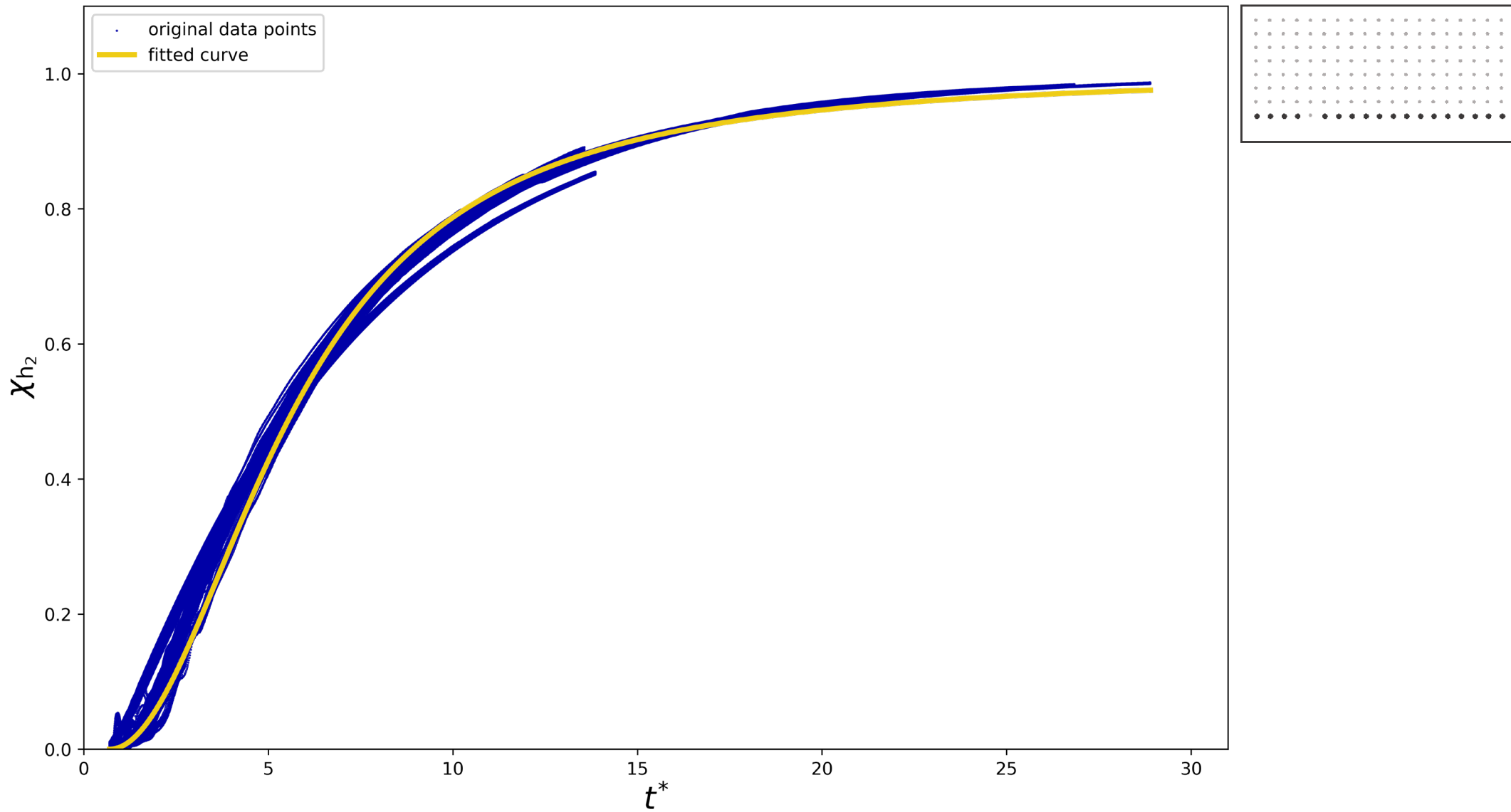


SO WHAT?

EXTEND SET OF FUNCTIONAL PARAMETERS

10 parameters $f(\chi_{h_2}, t, \dot{V}, h_0, h_d, l, w, h, \rho_0, \rho_a) = 0$ $D [m^2/s]?$

7 parameters $\psi\left(\chi_{h_2}, \frac{\dot{V} \cdot t}{h^3}, \frac{h_d}{h}, \frac{h_0}{h}, \frac{l}{h}, \frac{w}{h}, \frac{\rho_0}{\rho_a}\right) = 0$ $\frac{D \cdot t}{h^2}?$



Get in touch with me!



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