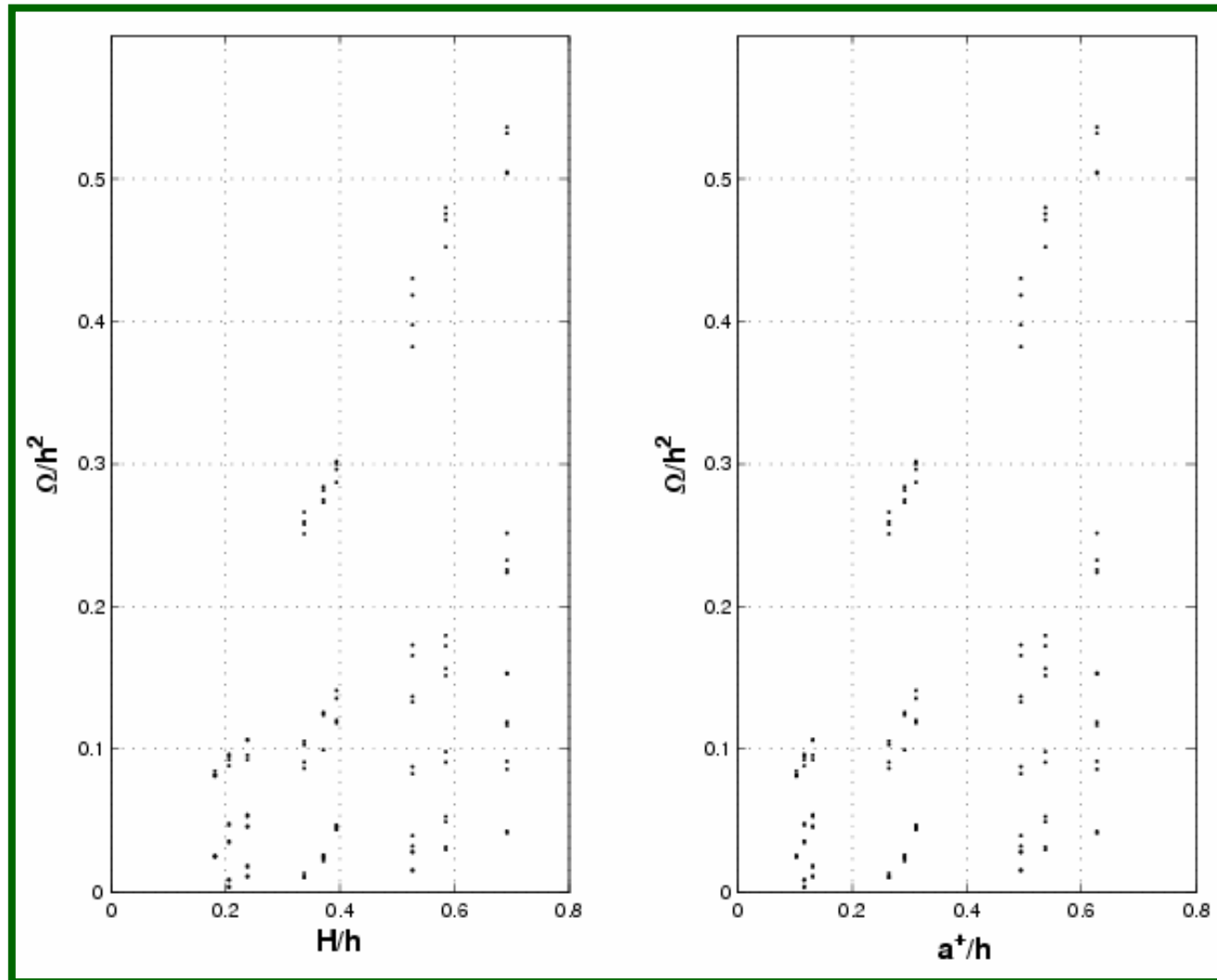


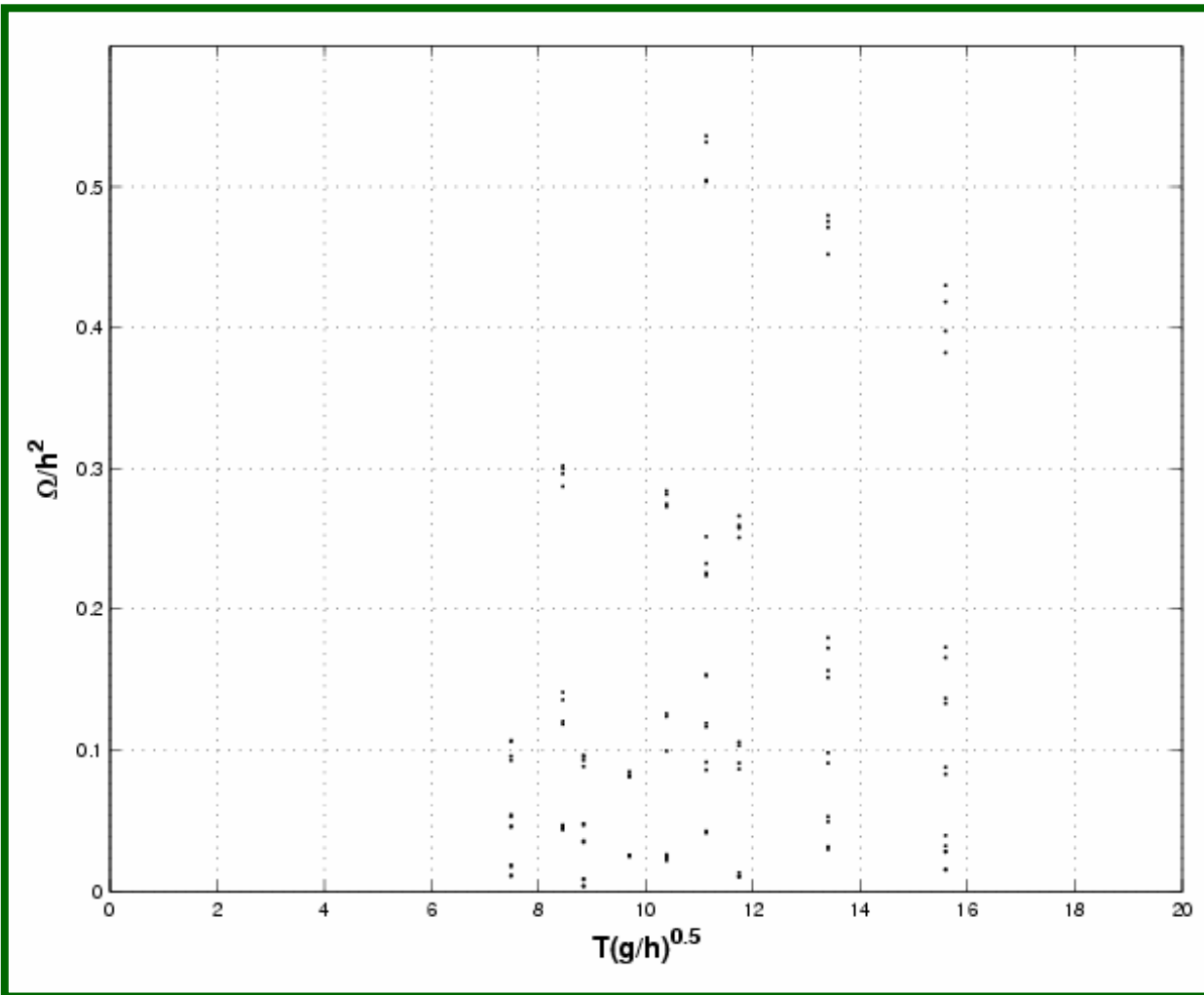


Wave overtopping: the experimental findings



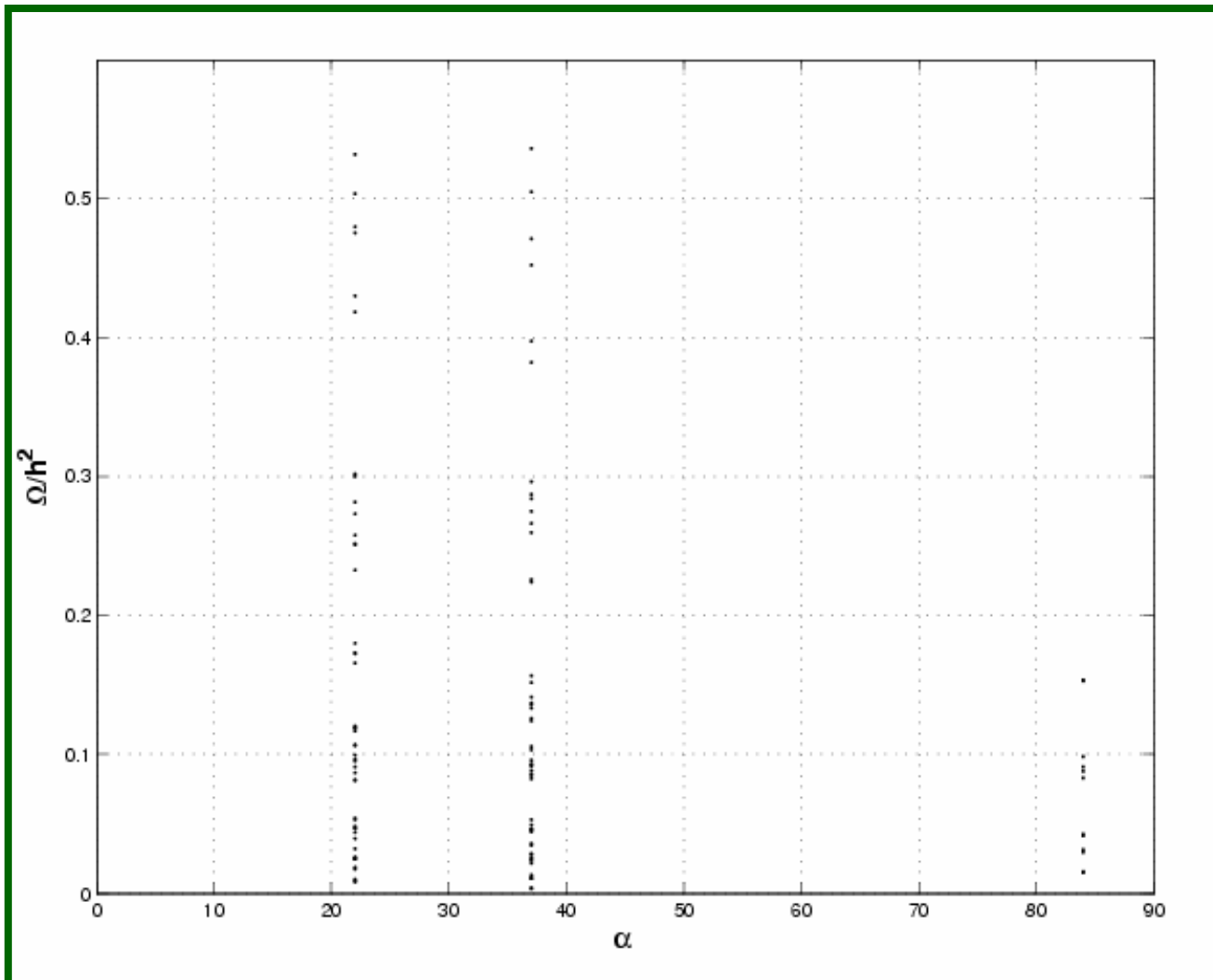


Wave overtopping: the experimental findings



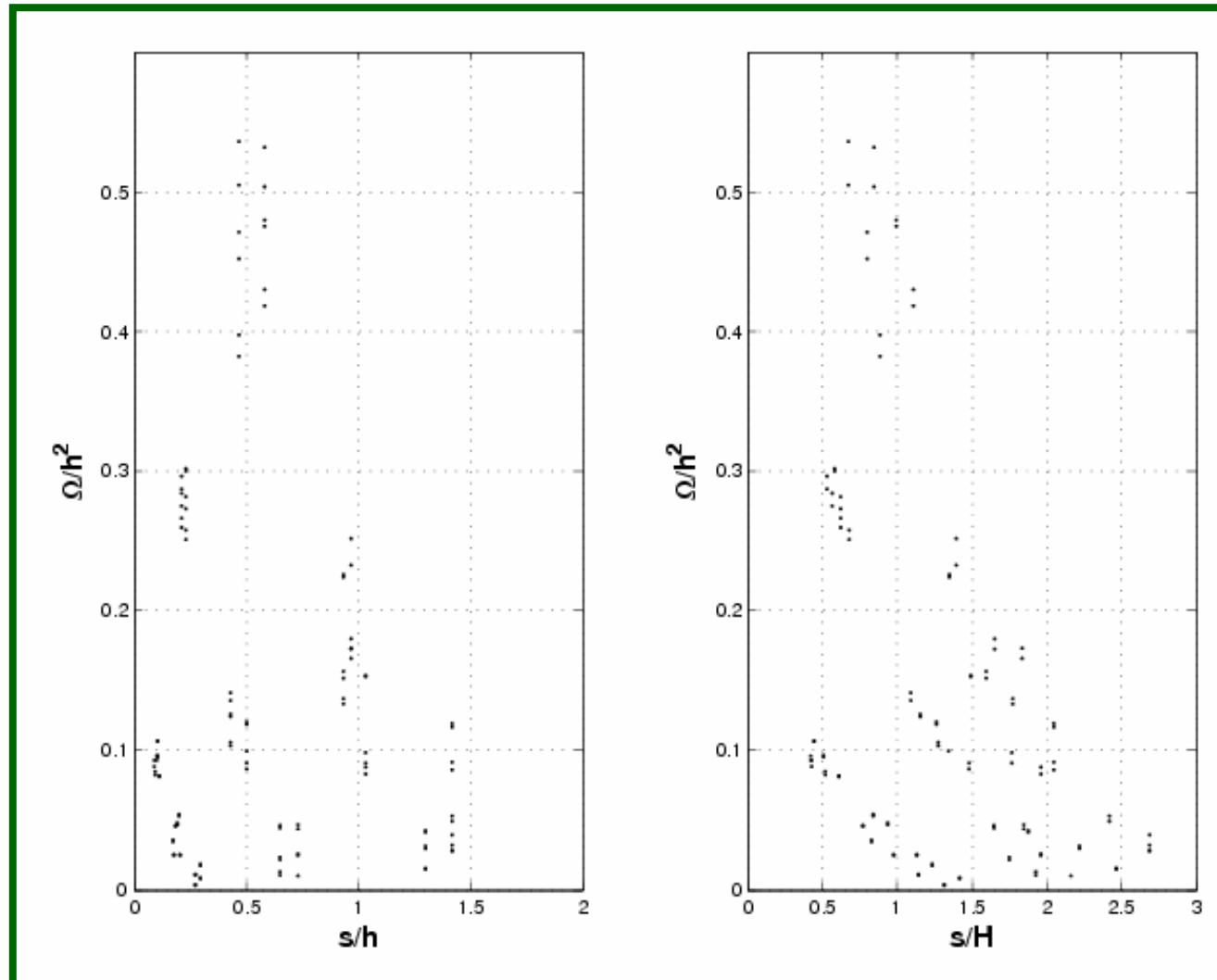


Wave overtopping: the experimental findings





Wave overtopping: the experimental findings





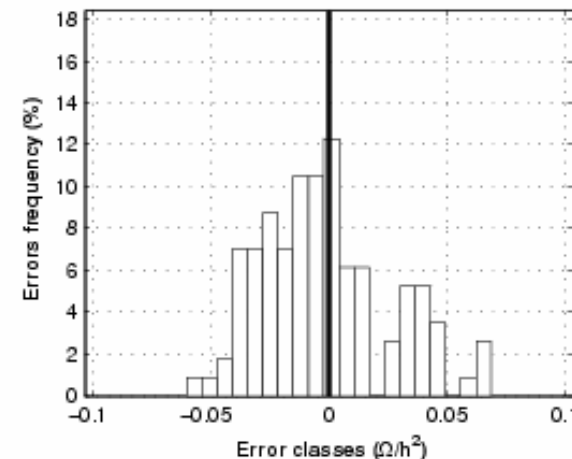
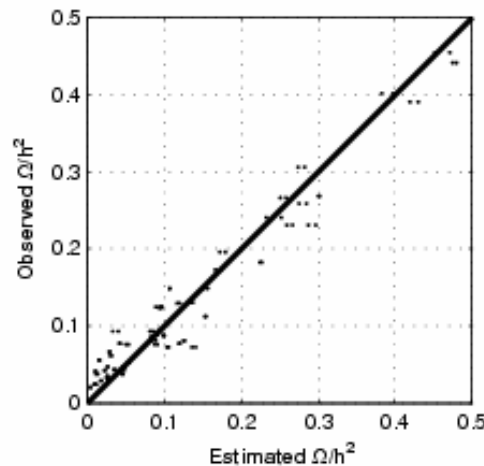
Impulsive wave overtopping: the experimental findings

- likebore waves, solitary waves, cnoidal waves and linear waves runup were observed
- wave overtopping volume **increases as incident wave height increases**
- wave overtopping volume **increases as incident wave period increases**, the wave period must to be taken into account
- **beach slope influence** is different **depending on incident wave type**
- wave overtopping volume **increases as freeboard decreases**



Impulsive wave overtopping: the new empirical formulations

	Factor	H/h	$T(\sqrt{g/h})$	$\sin(\alpha)$	s/h	R^2	$\bar{\epsilon}$
	a_1	a_2	a_3	a_4	a_5		
Ω	0.0084	3.1765	1.5782	-0.6141	-1.6204		
	± 0.0042	± 0.1558	± 0.1858	± 0.0973	± 0.0978	0.96042	0.022188



Impulsive wave overtopping: comparison with existing formulae

Muller formula (1995)

$$\frac{\Omega}{\Omega_0} = \left(1 - \frac{s}{R_u}\right)^{2.22}$$

$$\frac{\Omega_0}{Ch^2} = 1.45c_0 \left(\frac{H}{h}\right)^{\frac{4}{3}} \left(T\sqrt{\frac{g}{h}}\right)^{\frac{4}{9}}$$

$$\frac{\Omega}{Ch^2} = 1.45c_0 \left(1 - \frac{s}{R_u}\right)^{2.22} \left(\frac{H}{h}\right)^{1.33} \left(T\sqrt{\frac{g}{h}}\right)^{0.44}$$

	Factor	H/h	$T(\sqrt{g/h})$	$\sin(\alpha)$	s/h	R^2	$\bar{\epsilon}$
	a_1	a_2	a_3	a_4	a_5		
Ω	0.0084	3.1765	1.5782	-0.6141	-1.6204		
	± 0.0042	± 0.1558	± 0.1858	± 0.0973	± 0.0978	0.96042	0.022188



Conclusions

1. An **ad hoc experimental investigation on generation and propagation of impulsive waves generated by vertical landslides** was performed.
2. New **empirical formulations** to predict vertical slump generated wave main parameters (wave height and wave period) for both **2D and 3D water bodies** are proposed.
3. An **experimental investigation** aimed at gaining insight about **landslide generated wave runup** was performed and a new **empirical formulation** is proposed. For the first time the incident wave period is taken into account.
4. A new **empirical formulation** is proposed for a zero thickness overtopped structure crest (resulting in a conservative estimation) simple to use if compared to existing tools.