Constraining tsunami source—
Inverse modeling of velocities and inferred cause of overwash that emplaced inland fields of boulders at Anegada, British Virgin Islands

Publication: Buckley, M., Jaffe, B.E., Wei, Y., and Watt, S., 2012, Estimated velocities and inferred cause of overwash that emplaced inland fields of cobbles and boulders at Anegada, British Virgin Islands, Natural Hazards, v. 63, no. 1, p. 133-149. doi:10.1007/s11069-011-9725-8

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USGS
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AGU
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San Francisco, CA

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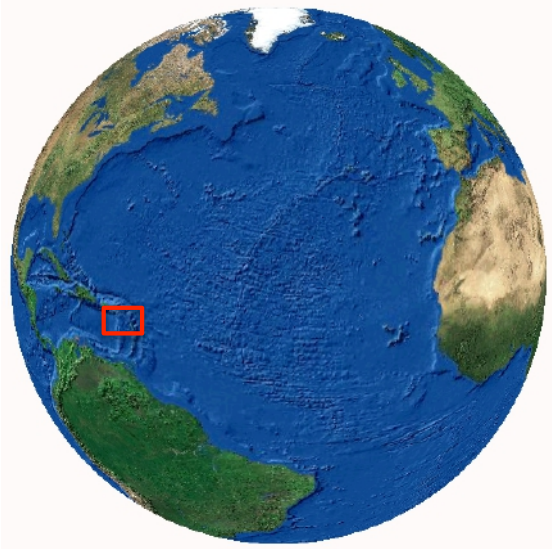
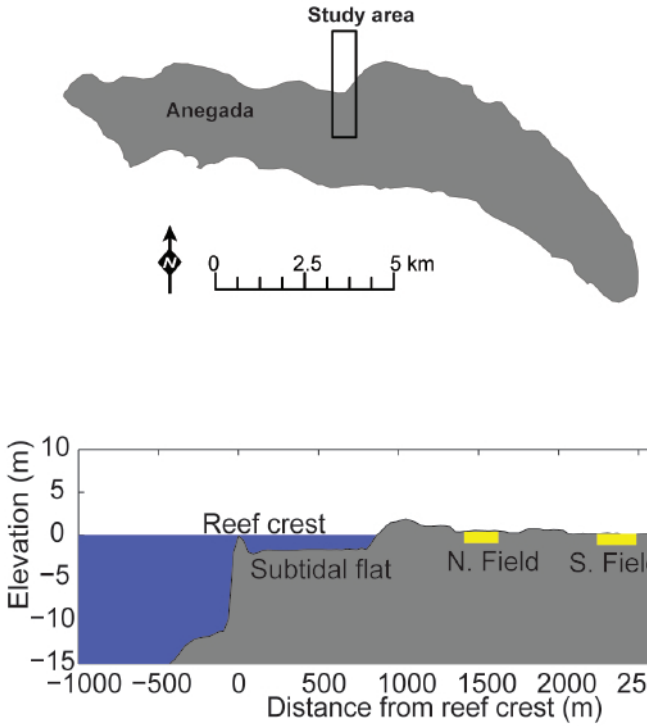
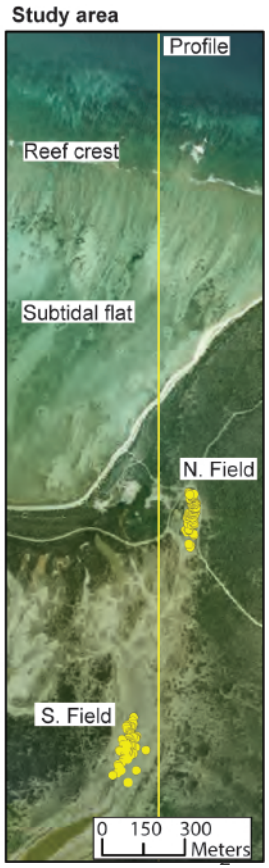
Site description







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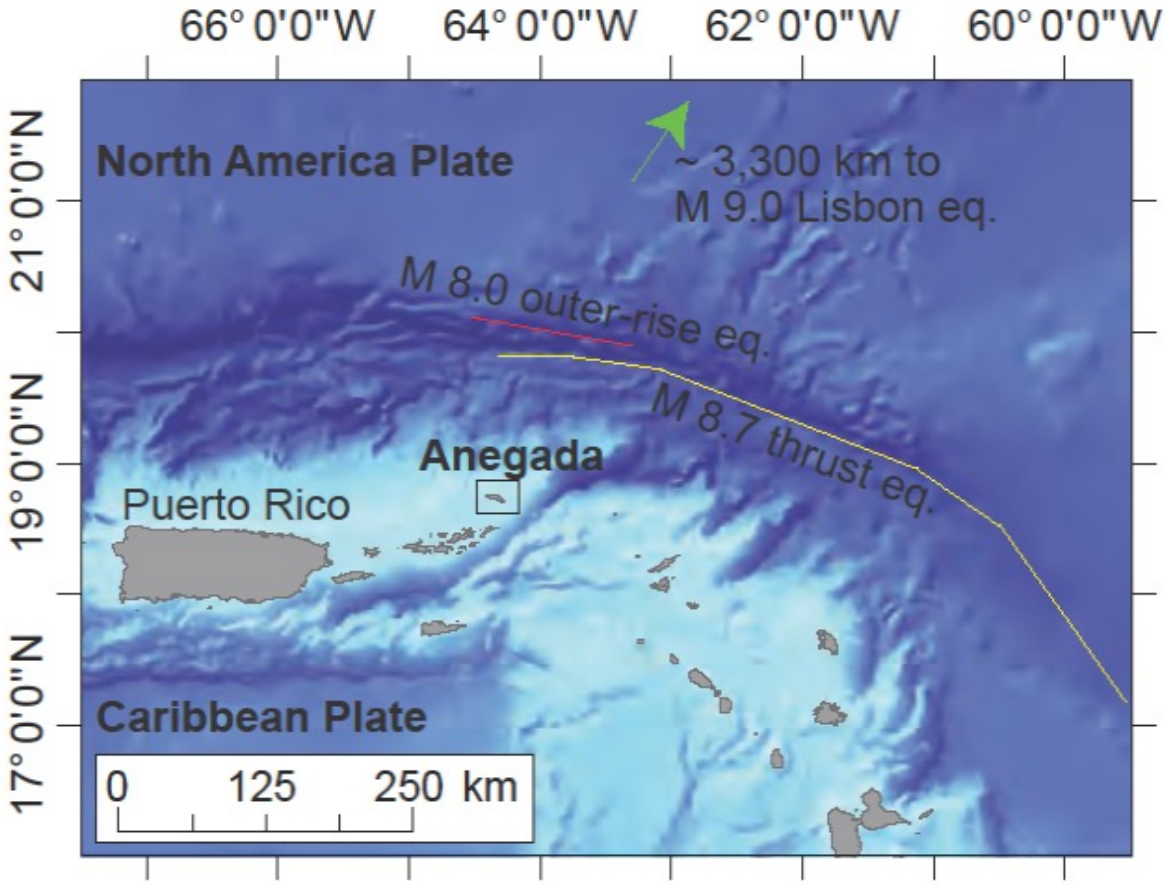
Possible overwash sources



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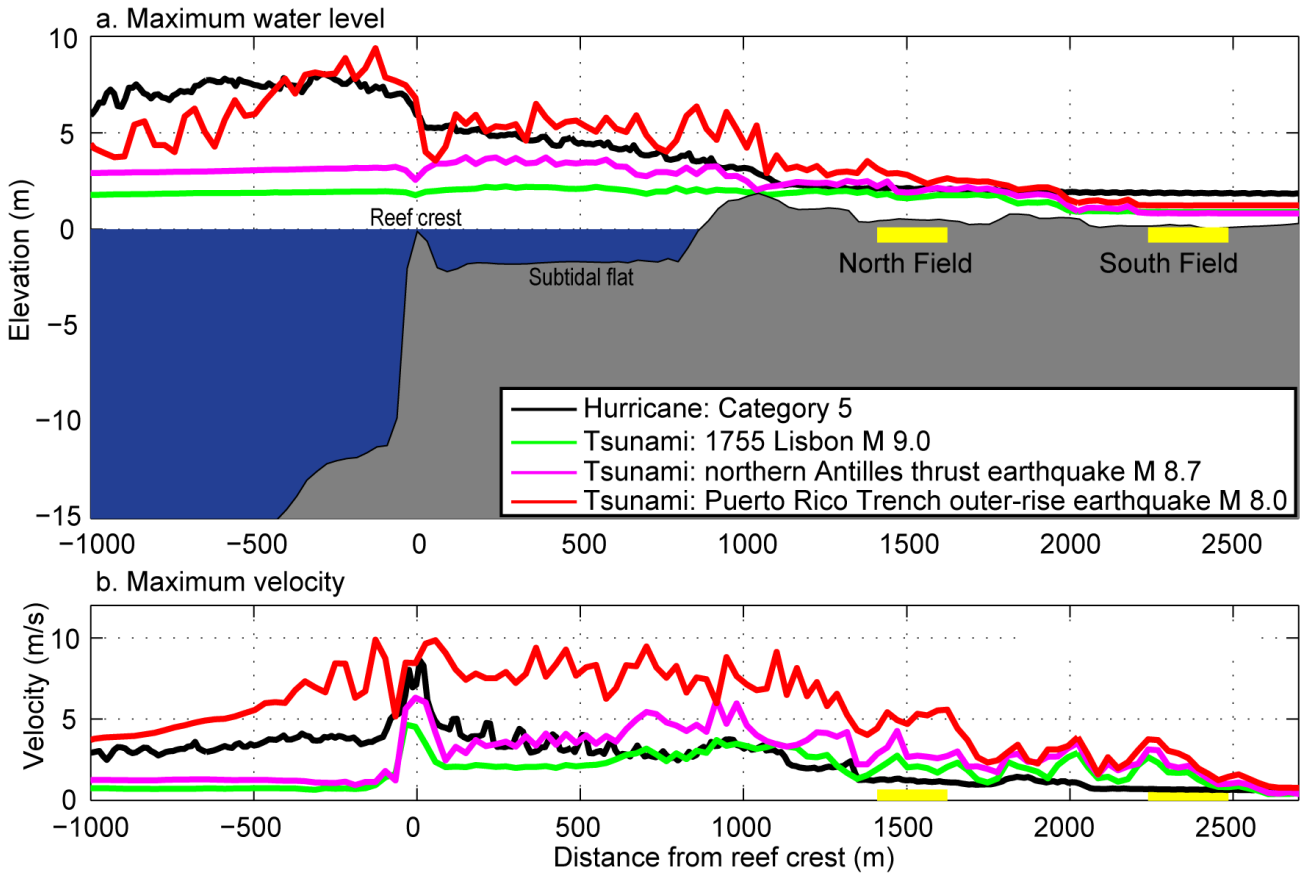
Numerical modeling results



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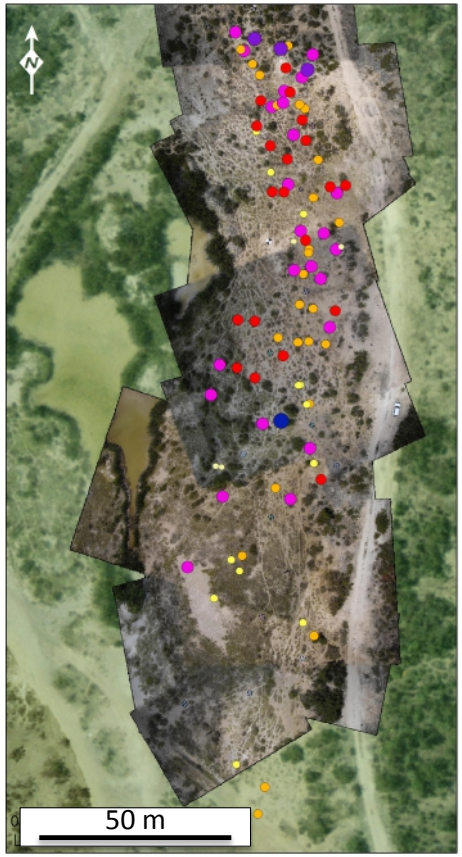
Field measurements of boulders



Boulder wt (kilograms)

- 1.43 - 10.00
- 10.01 - 25.00
- 25.01 - 50.00
- 50.01 - 100.00
- 100.01 - 250.00
- 250.01 - 500.00
- 500.01 - 774.68

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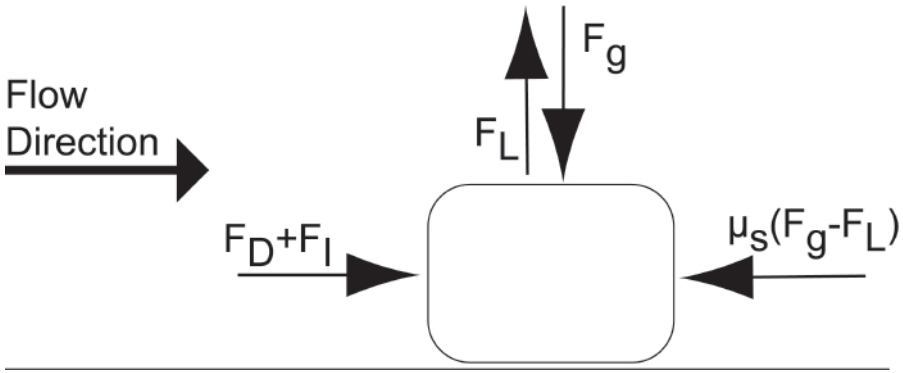
Inverse boulder transport model

Forces

- Drag force, F_D
- Inertia force, F_I
- Lift force, F_L
- Gravitational force, F_g

Forces formulations

- $F_D=0.5\rho_f C_D A_N u^2$
- $F_I=\rho_f C_M V\dot{u}$
- $F_L=0.5\rho_f C_L A_L u^2$
- $F_g=(\rho_s-\rho_f)Vg$
- **For sliding:**
  - $\mathbf{F_D+F_I> \mu_s(F_g-F_L)}$



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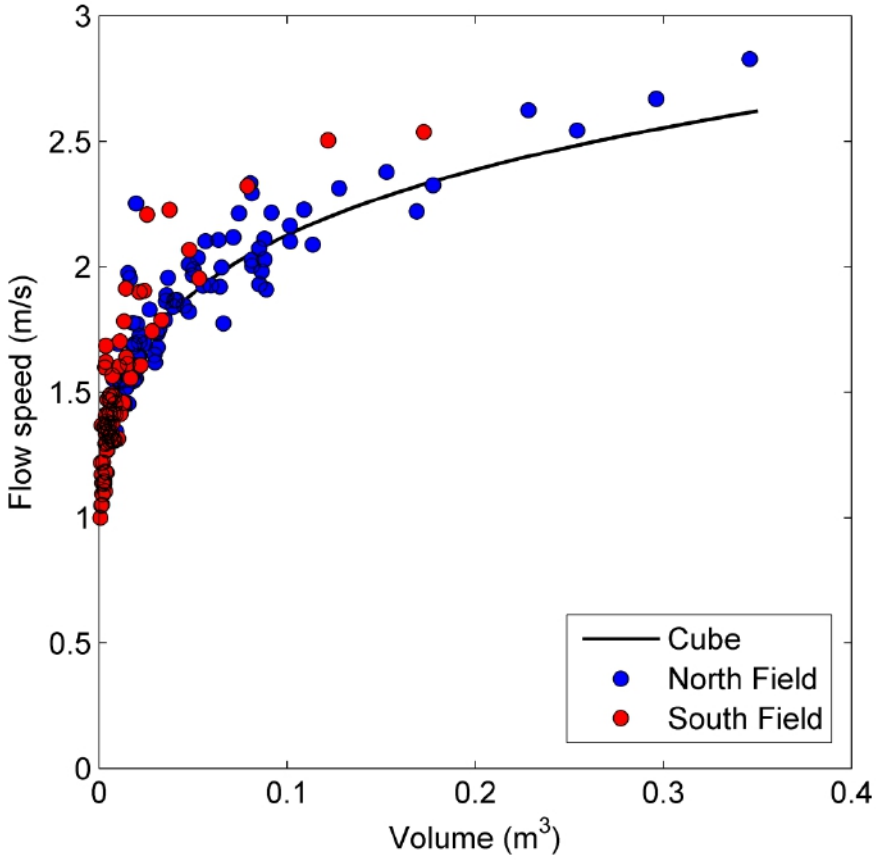
Calculated flow speed



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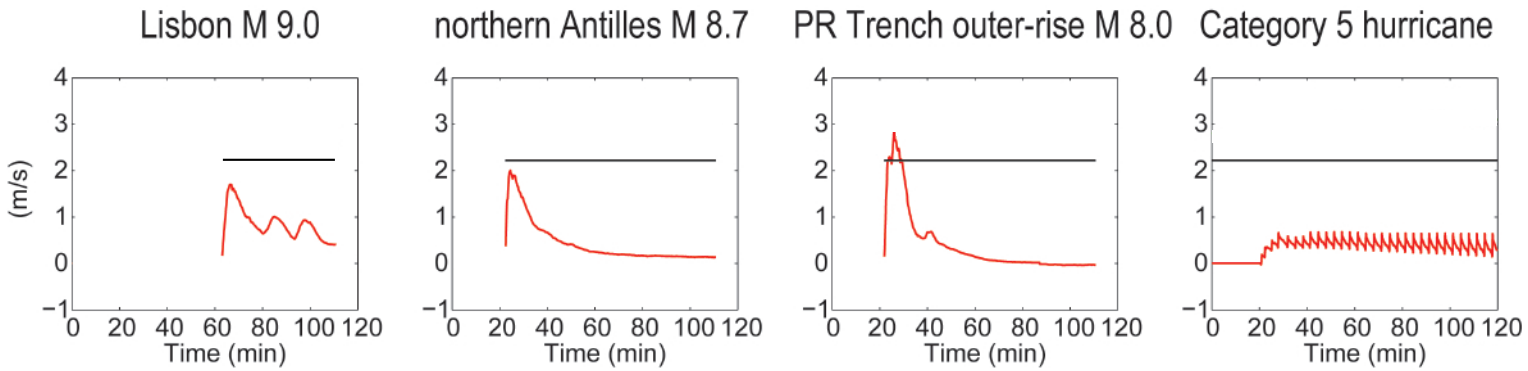
Boulder constraints on tsunami source



Calculated flow speed for transport of largest boulders

Speed from numeric hydrodynamic models

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