

# Role of Aggregation In the Settling of Cohesive Floccs

**Ashish J. Mehta**

*Nutech Consultants, Inc., Gainesville, FL 32606, USA*

**William H. McAnally**

*Dynamic Solutions LLC, Knoxville, TN 37919, USA*

*Farzin Samsami*

*Hariot-Watt University, Edingurgh EH14 4AS, UK*

**Andrew J. Manning**

*HR Wallingford, Wallingford, Oxon OX10 8BA, UK*

**Floc growth (aggregation by collisions)**

**Floc breakup (disaggregation by collisions and flow shearing)**

**Shear rate  $G$**

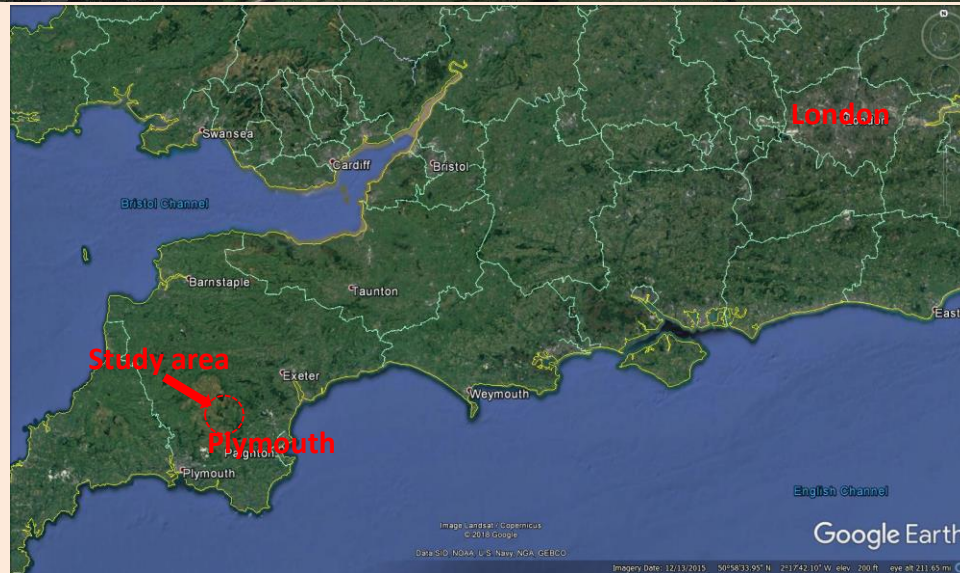
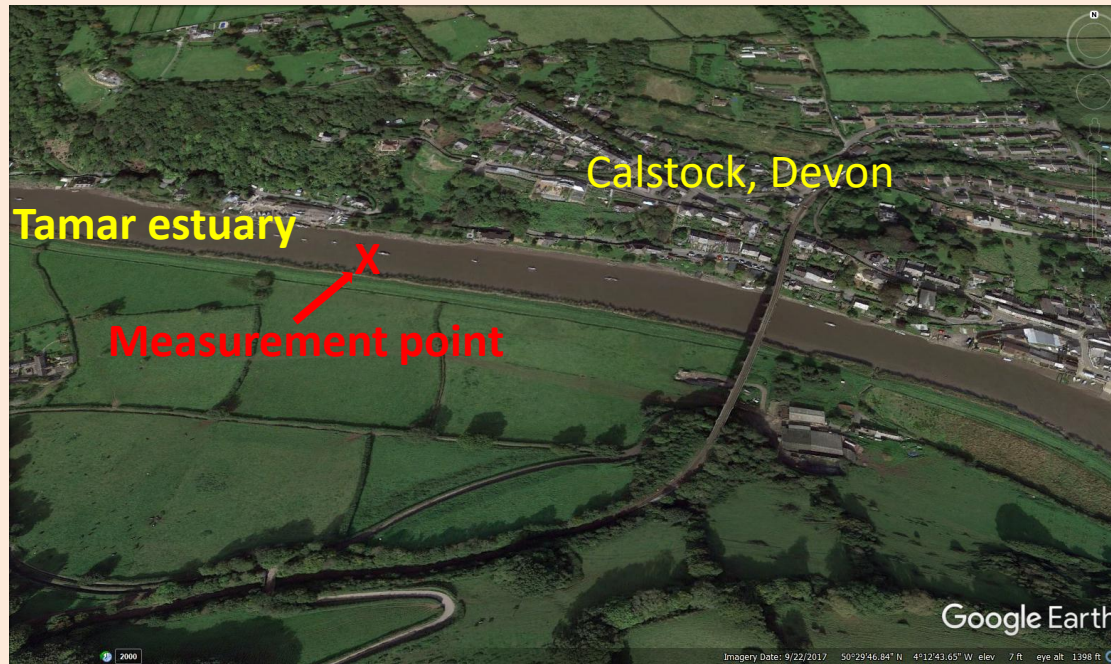
**Volume fraction  $\phi$  (or mass concentration  $C$ )**

**Diameter  $d_f$**

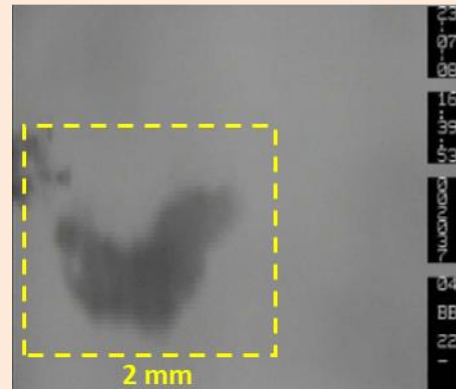
**Density  $\rho_f$**

**Settling velocity  $w_s$**

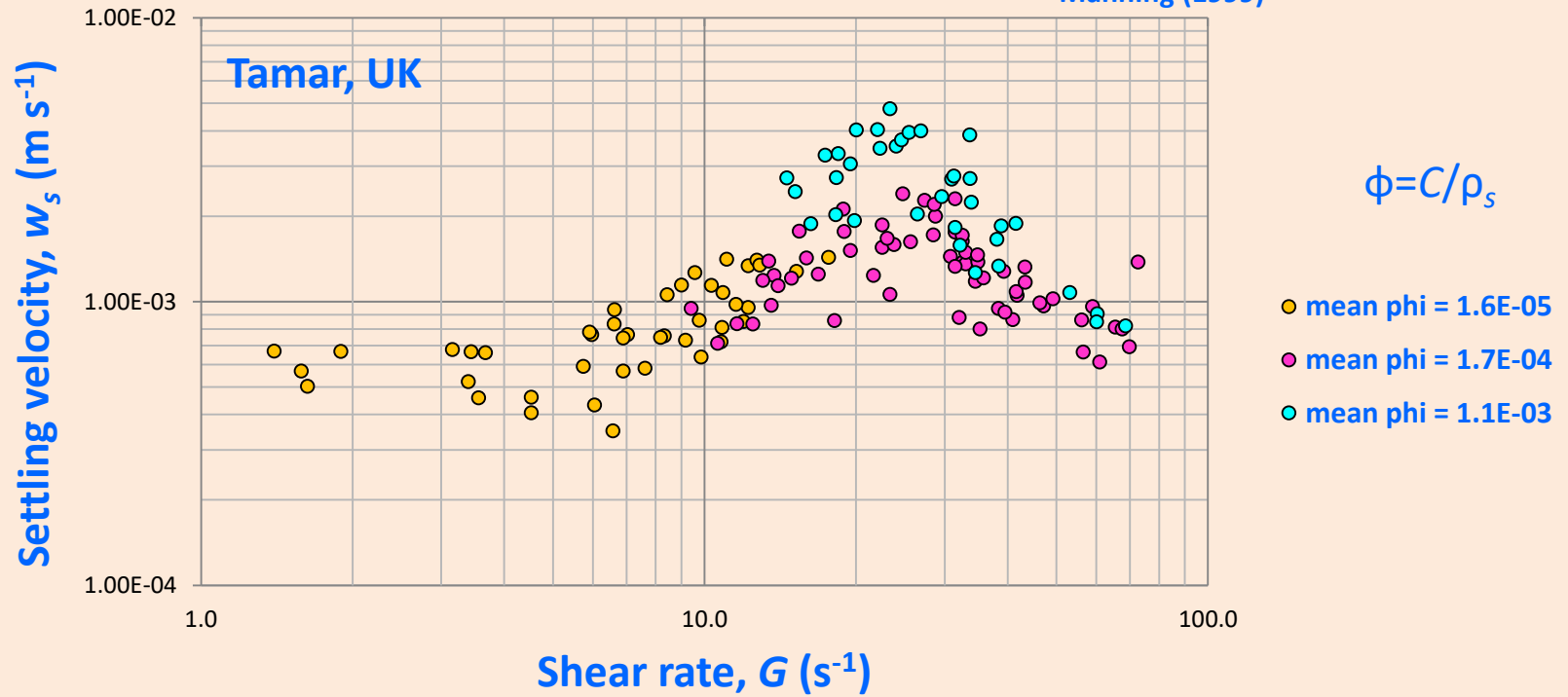
$$w_s = f(G, \phi)$$

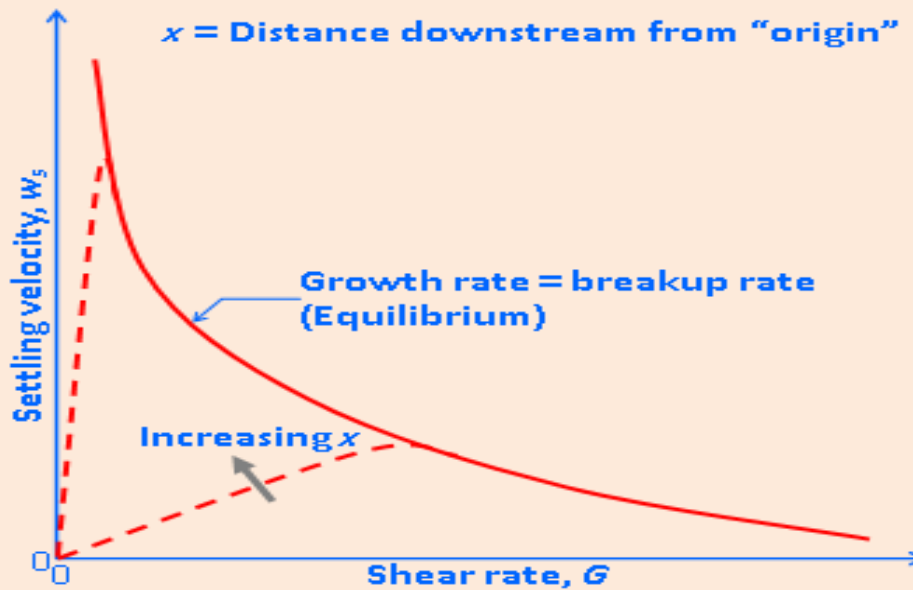
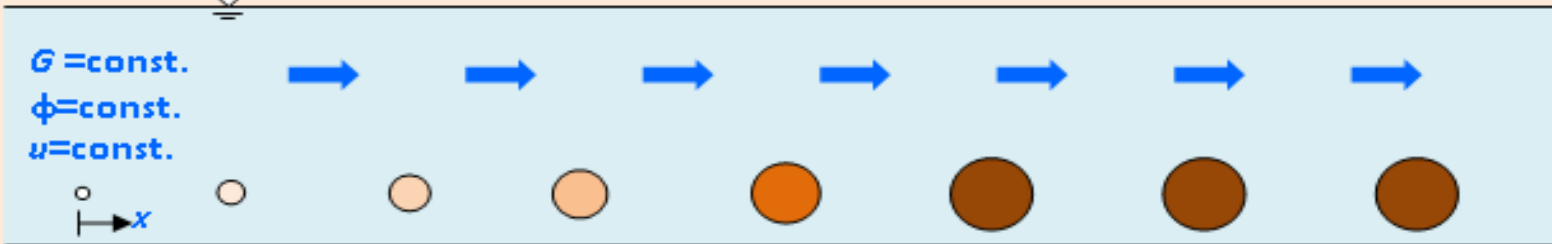
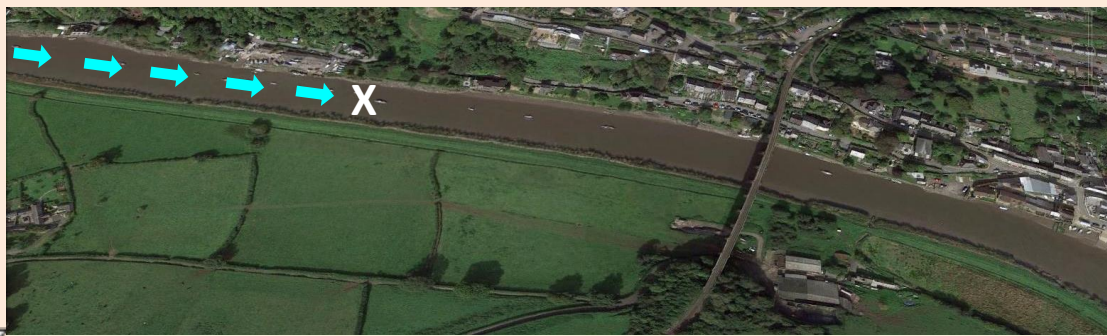


Manning (1999)



Manning (1999)



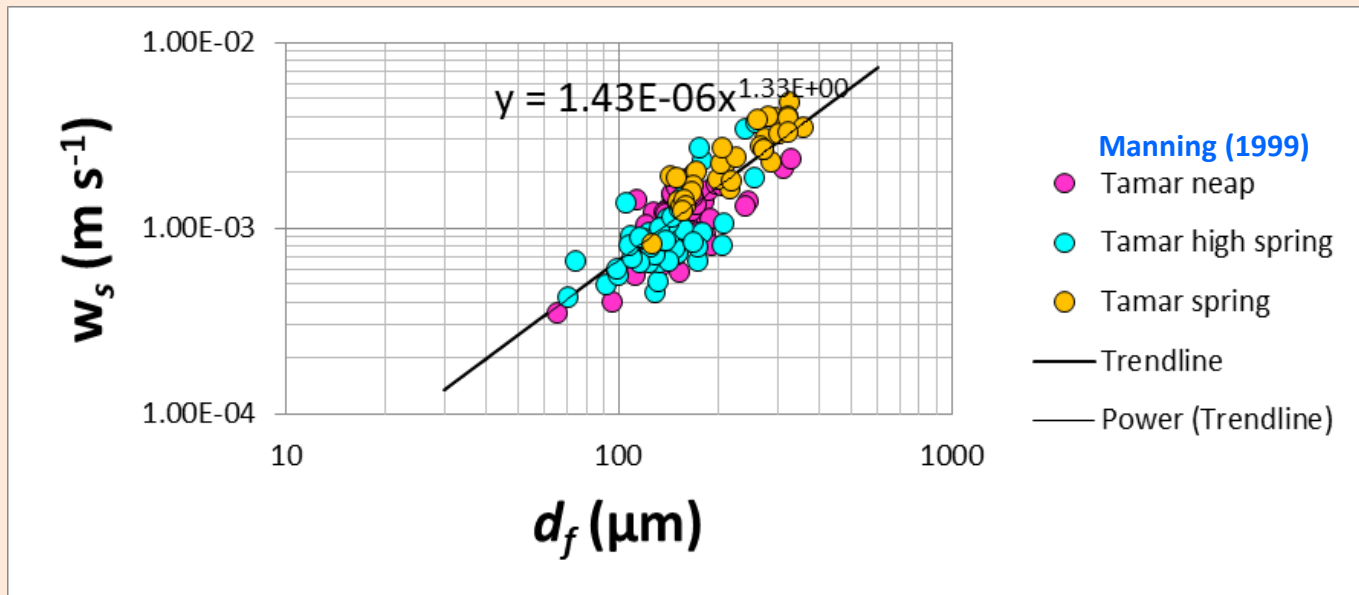
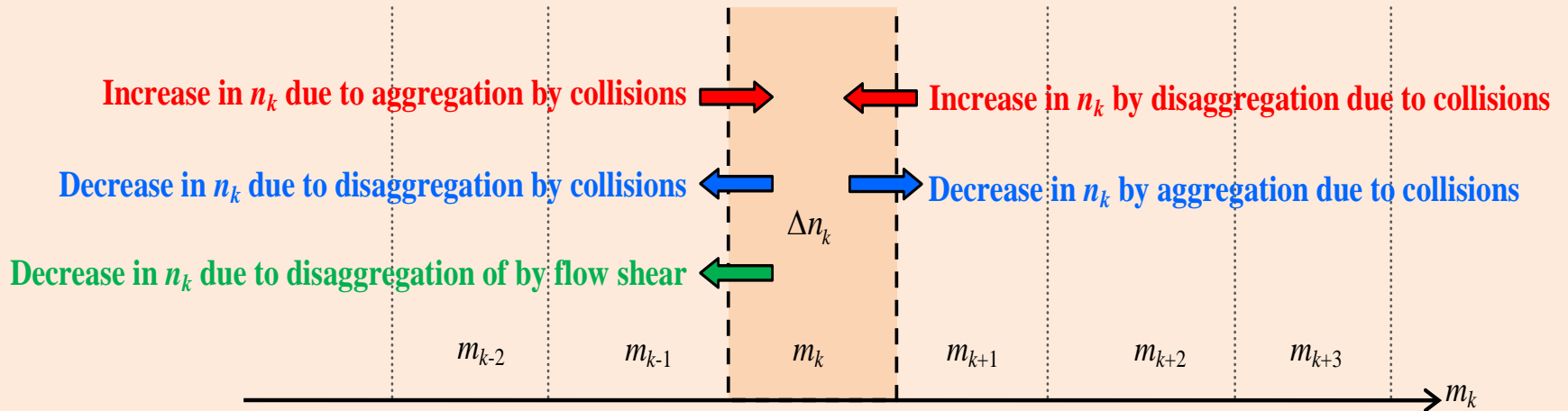


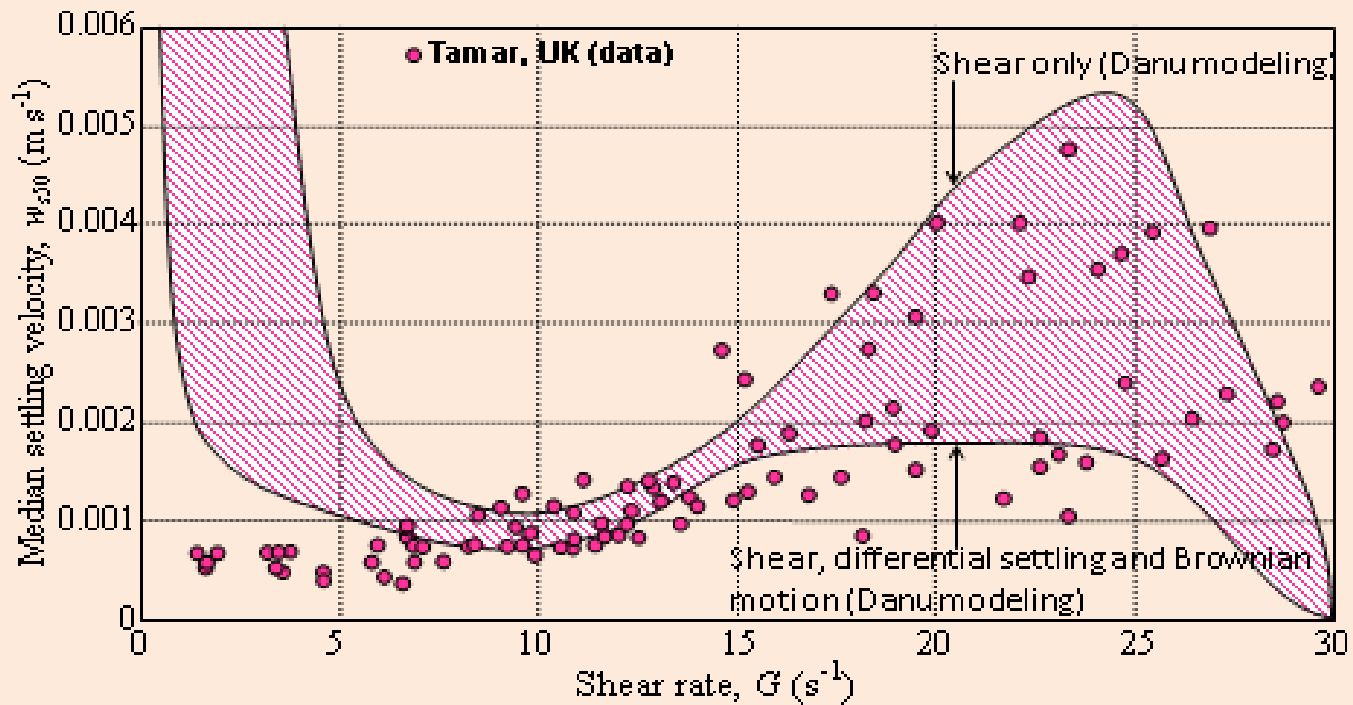
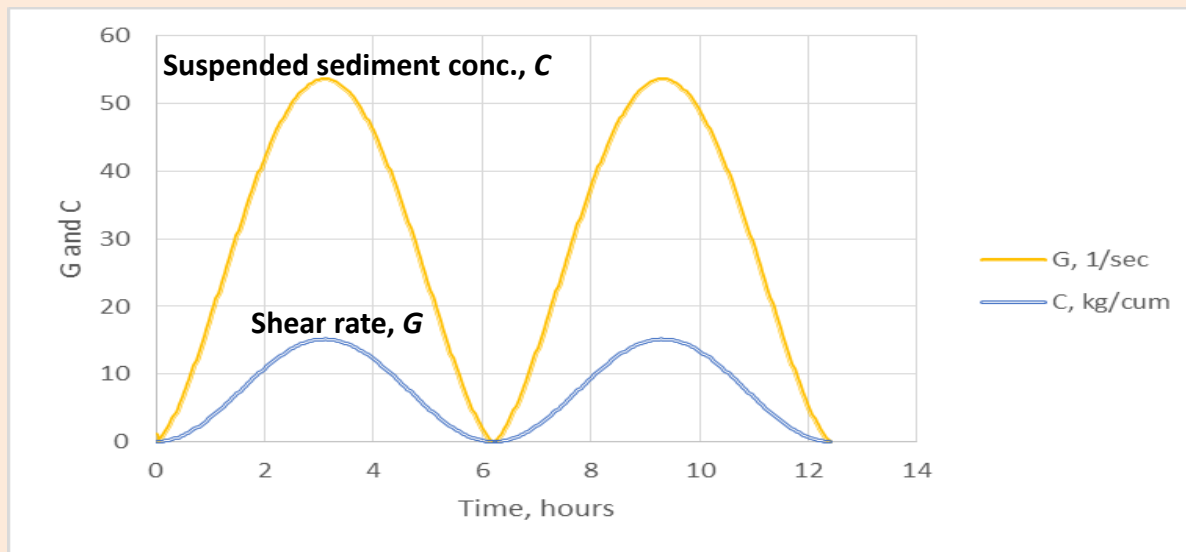
Winterwerp et al. (1998)

# Model DANU for aggregation dynamics (McAnally 1999)

$n$  = number of particles per unit volume

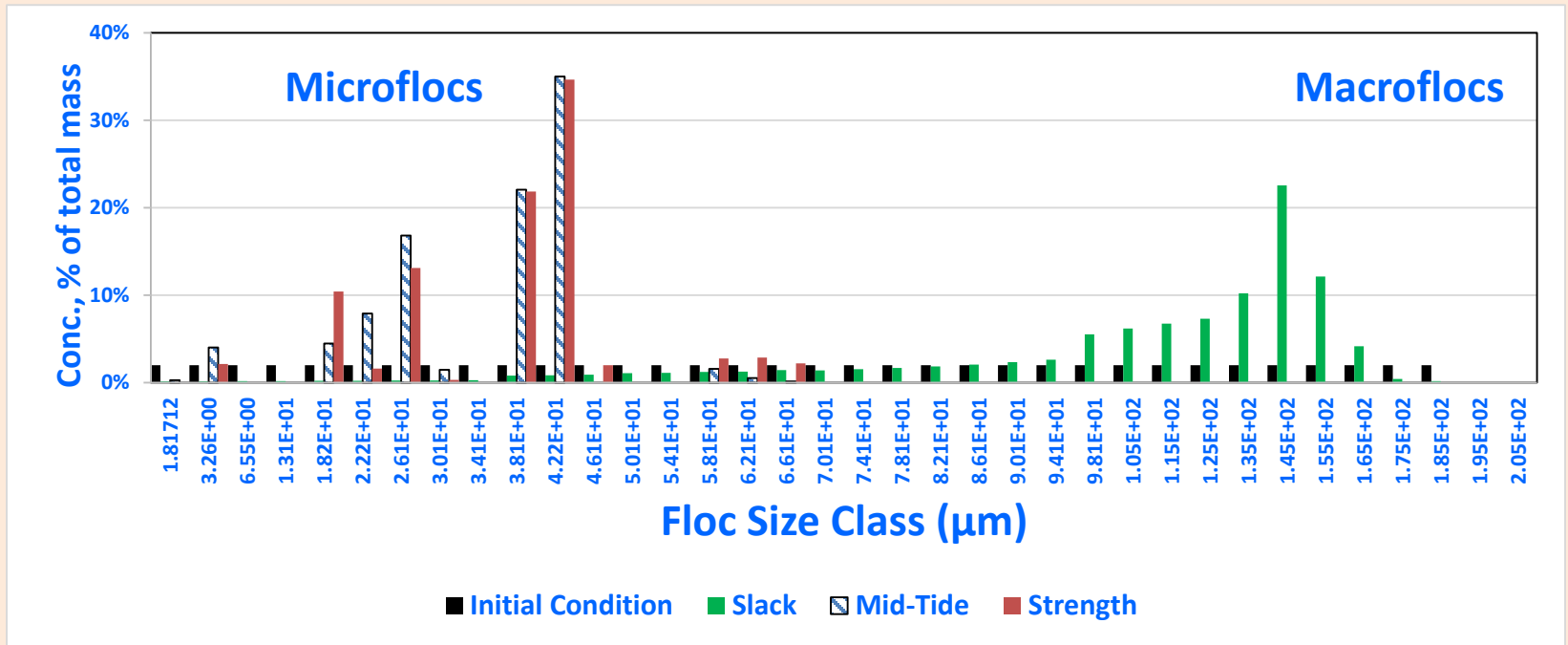
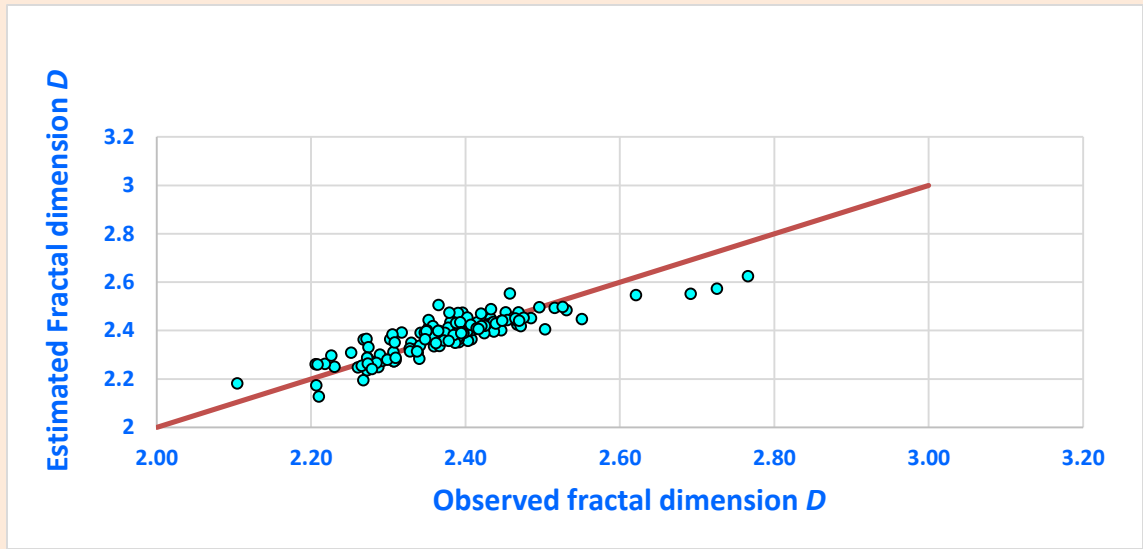
$m$  = particle mass





$$D_{est} = f(G, \phi)$$

Maggi (2007)



See also Lee et al. (2011)