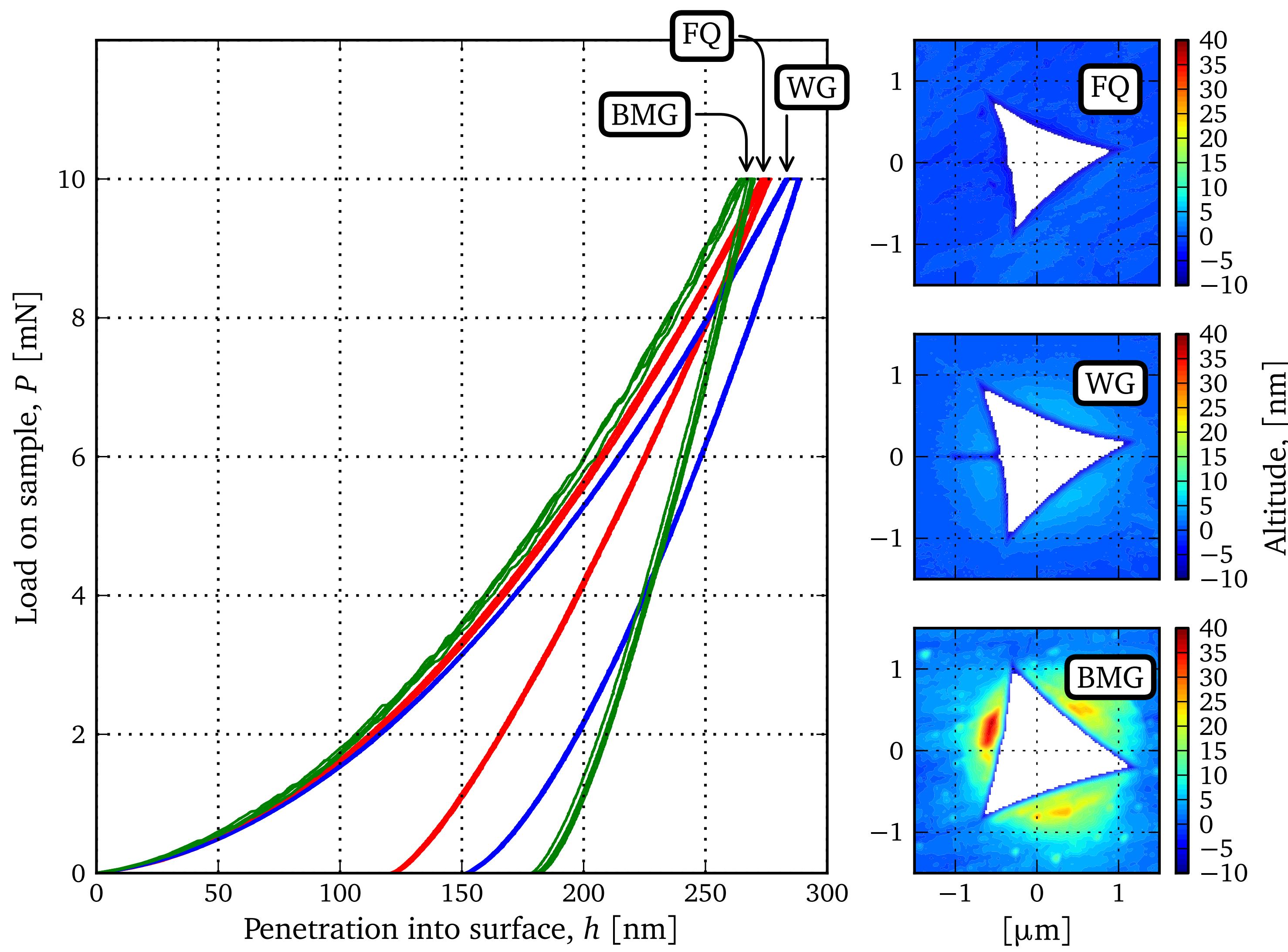


# Measuring the contact area by SPM imaging

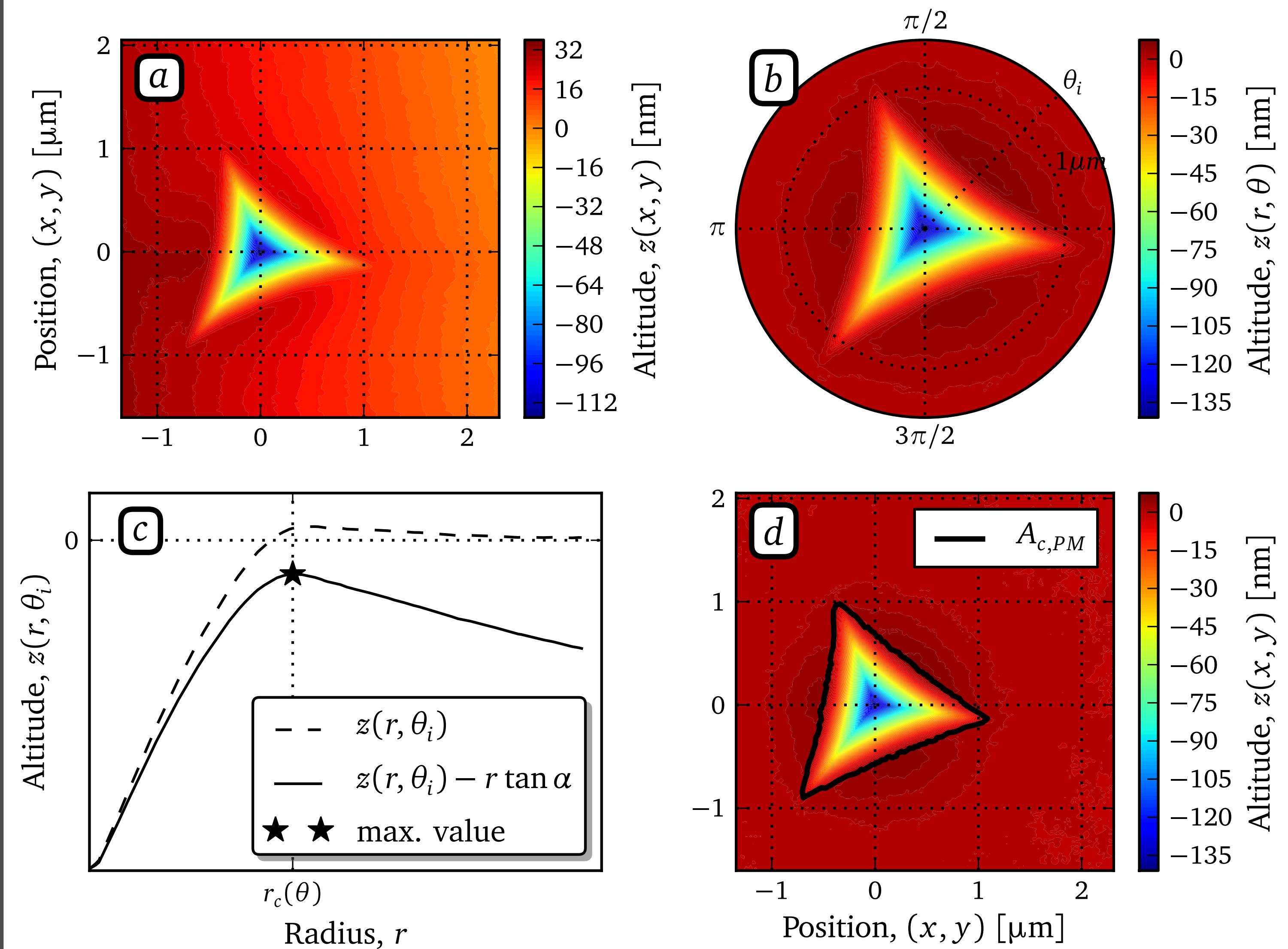
L. Charleux, V. Keryvin, J.-P. Guin, M. Nivard, J.-C. Sanglebœuf, Y. Yokoyama

Univ. Savoie Mont Blanc (France), Univ. Bretagne Sud (France), Univ. Rennes 1 (France), Tohoku Univ. Sendai (Japan)

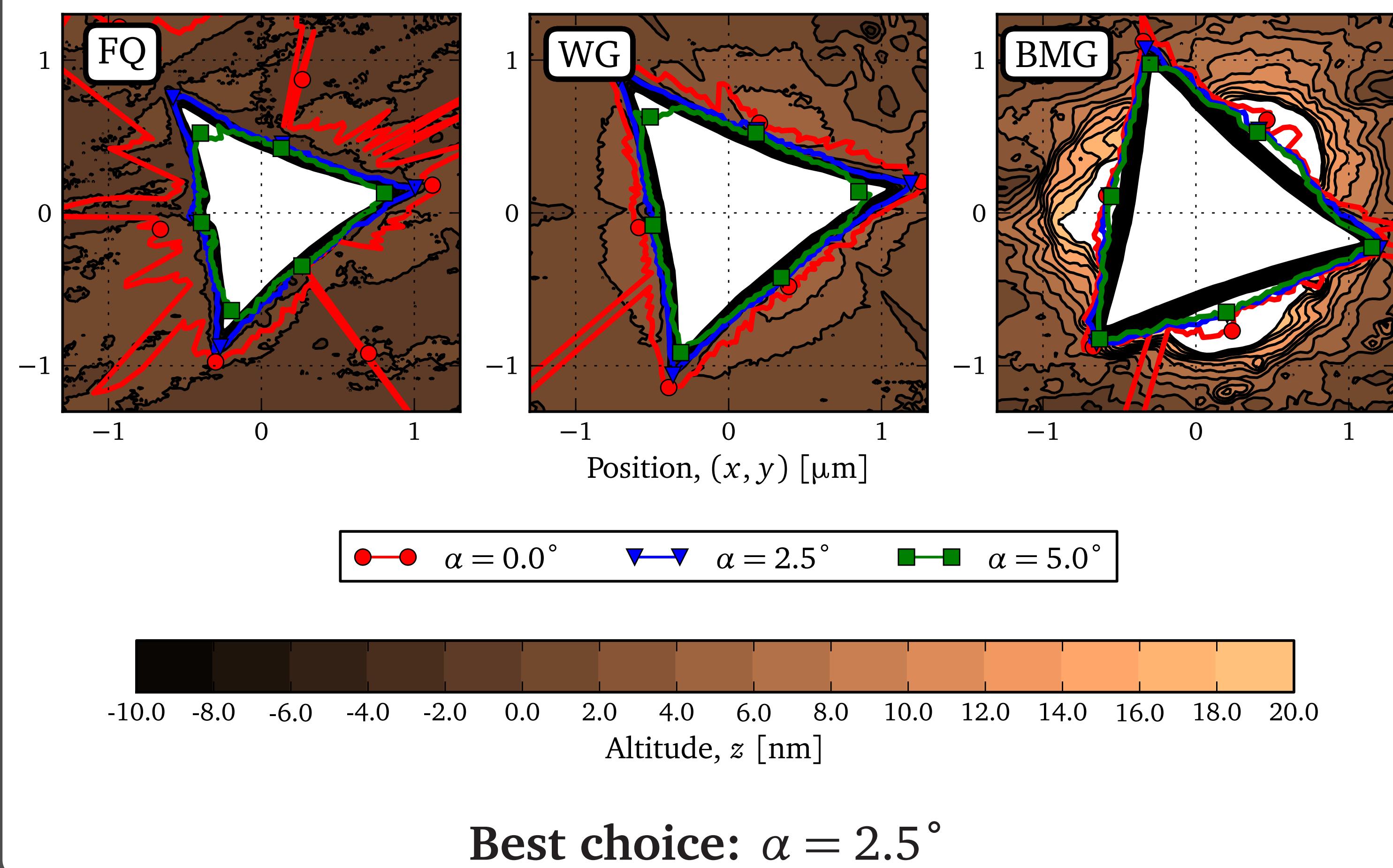
## Indentation + SPM imaging



## Measuring the contact area $A_c$



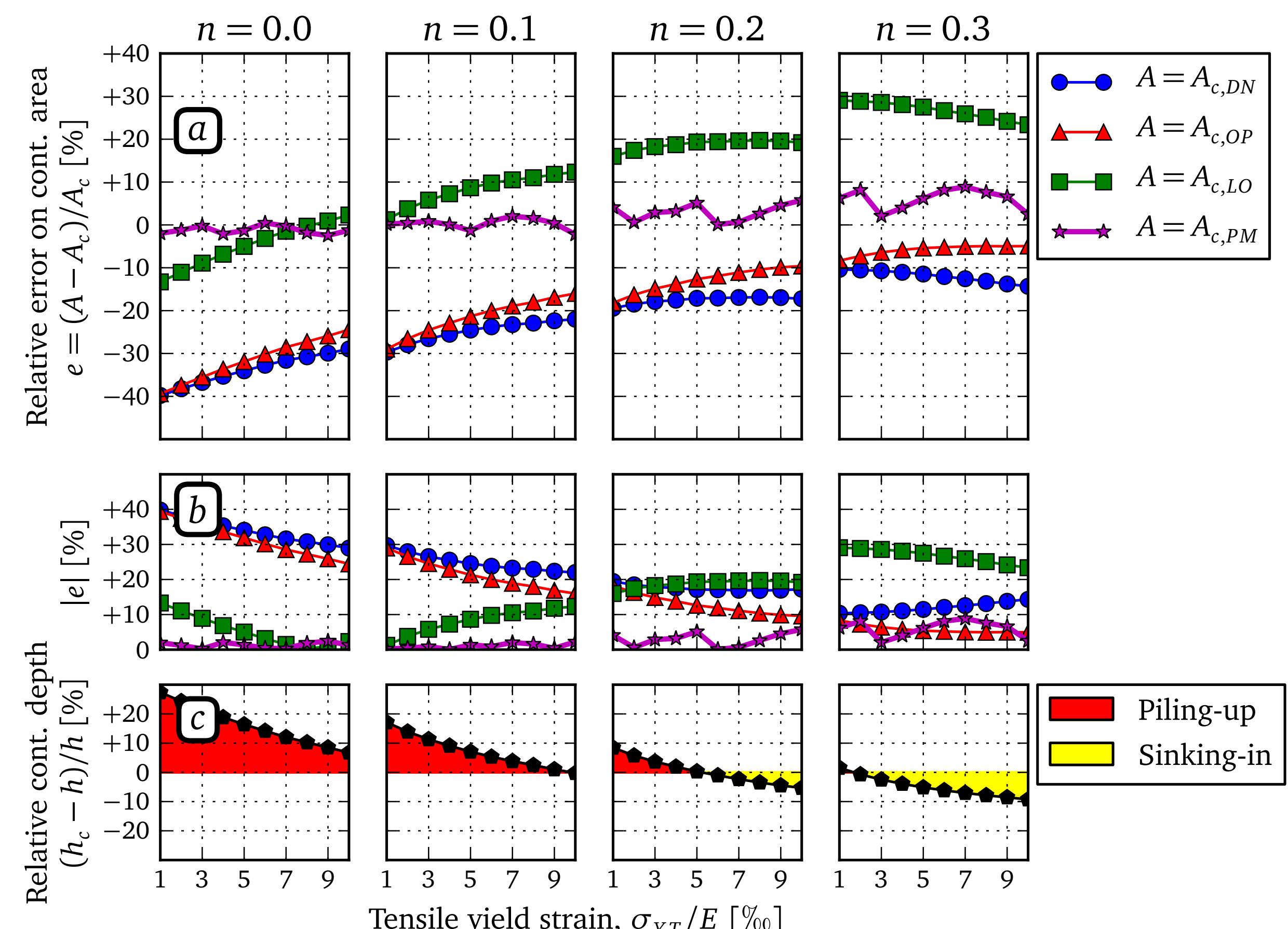
## The role of $\alpha$



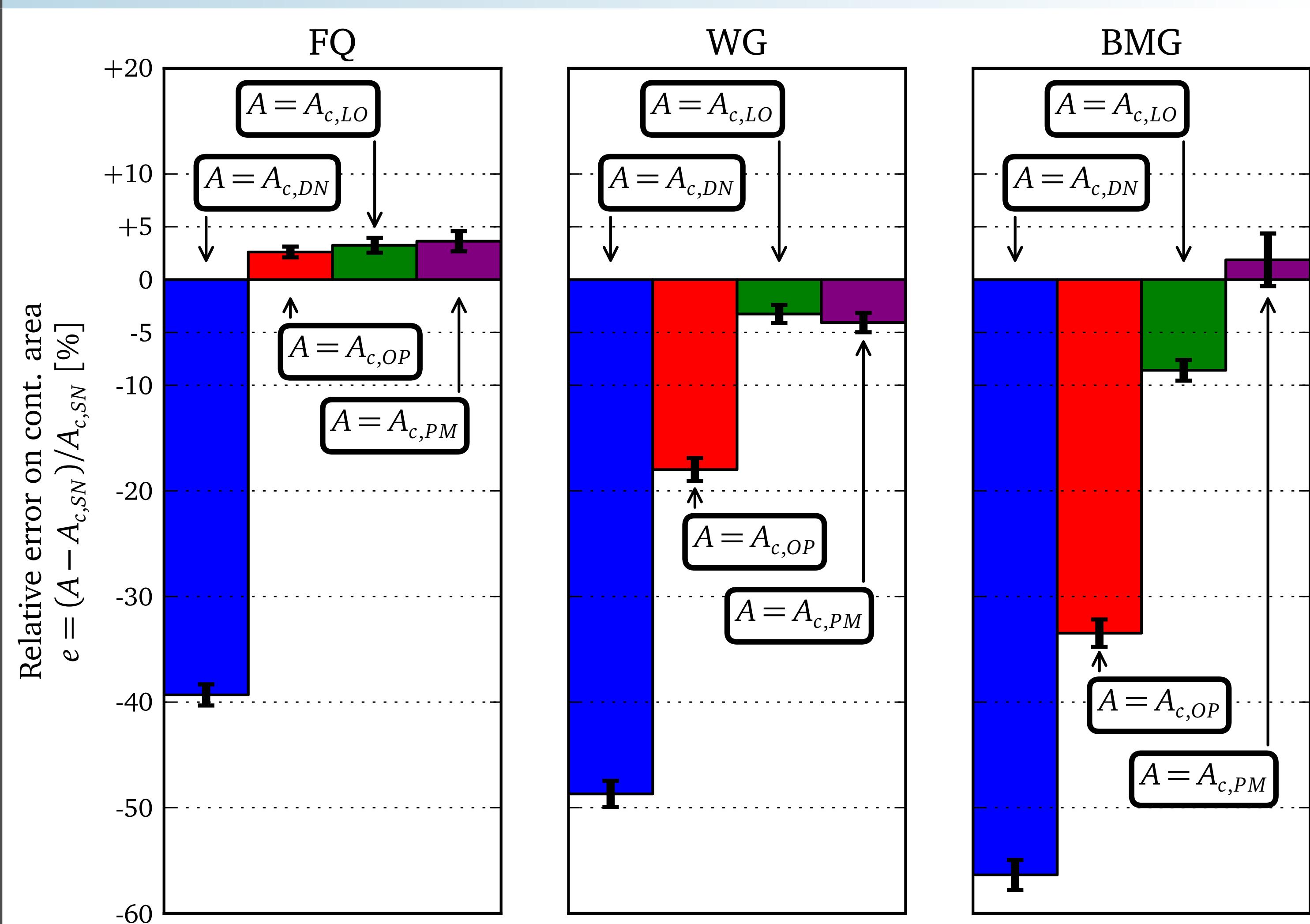
## Each cross section is tilted by $\alpha$

## Numerical benchmark

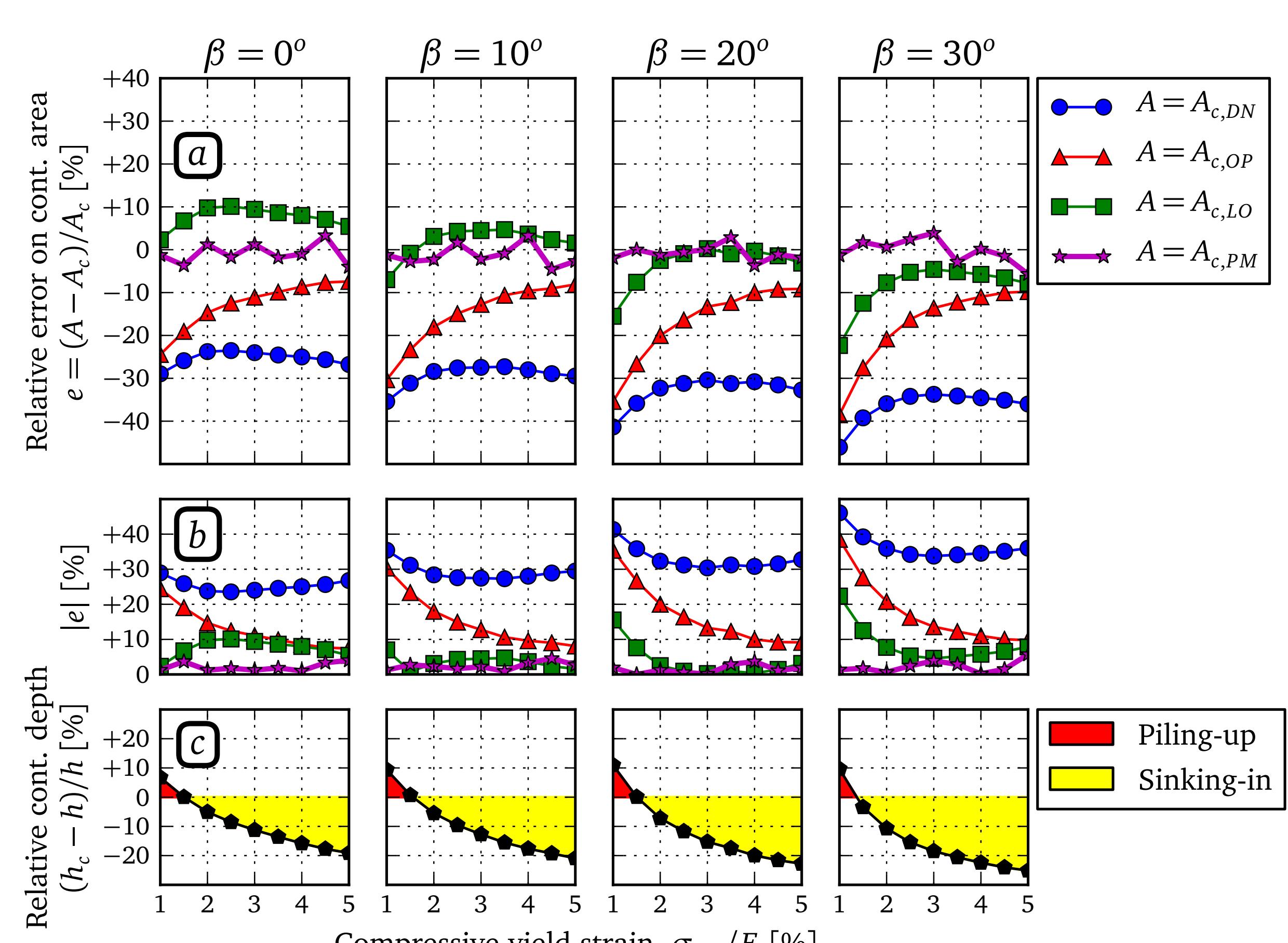
Hollomon: metallic alloys, power law hardening



## Experimental benchmark



Drucker Prager: metallic glasses, pressure sensitivity



## References

- <https://github.com/lcharleux/spym>
- L. Charleux, V. Keryvin, M. Nivard, J.-P. Guin, J.-C. Sanglebœuf, and Y. Yokoyama, "A method for measuring the contact area in instrumented indentation testing by tip scanning probe microscopy imaging" *Acta Mater.*, vol. 70, pp. 249–258, 2014.

DN : M. F. Doerner and W. D. Nix, "A method for interpreting the data from depth-sensing indentation instruments" *J. Mater. Res.*, vol. 1, no. 04, pp. 601–609, 1986.

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LO : [J. L. Loubet, J. M. Georges, O. Marchesini, and G. Meille, "Vickers Indentation Curves of Magnesium Oxide (MgO)," *J. Tribol.*, vol. 106, no. 1, p. 43, 1984.