River width selection FOURRIÈRE ANTOINE, CLAUDIN PHILIPPE, ANDREOTTI BRUNO, ESPCI-PMMH — The ancient problem of natural width selection in rivers has still remained open up to now. It is revisited, combining an experimental approach at laboratory scale, measurements on natural sand rivers and theory. We show that the scaling law of the width with the square root of flow rate, both obtained experimentally in controlled condition and in the field can be related to two mechanisms:

- the erosion threshold on the banks,

- the transverse diffusion of longitudinal momentum.

We show that a simple viscosity or an isotropic turbulent viscosity would lead to a different behavior. We recover quantitatively the shape of the bed, the velocity profile and the different scaling laws when the anisotropy of the Reynolds stress is taken into account. Our results open new perspectives about the parameters governing river morphology.

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Date submitted: 04 Aug 2006   Electronic form version 1.4