



## **A theoretical analysis of controls on mixing at the junctions of large rivers**

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Whilst detailed field research has identified the key controls on the rate at which small rivers (< 50 m in width) mix, there is much less research into what controls the mixing rates in large rivers. This paper approaches the problem from theoretical principles by means of a basic force balance analysis. This uses principles similar to those adopted for river meanders and first develops them for the case of river junctions and second for the special case of large river junctions. In order to compare the small river case with the large river case, hydraulic geometry relationships and data from digital remote sensing are used to parameterise the changing relationship between controlling parameters in the force balance analysis. This shows that the mixing lengths scale with basic geometrical considerations provided that the conventional emphasis on width:depth ratio is combined with a consideration of changing radius of curvature and momentum ratio.