



The sediment and carbon fluxes for the Irrawaddy and Salween rivers of Myanmar; contributions of a large tectonically active, tropical river system

R.A.J Robinson (1), M.I. Bird (1), N.W Oo (2), D.L. Higgitt (3), X.X. Lu (3), T.B. Hoey (4), A. Swe (5), and T. Tun (6)

(1) School of Geography and Geosciences, University of St Andrews, St Andrews, Fife KY16 9AL, UK (rajr@st-andrews.ac.uk), (2) Department of Geography, University of Pyay, Pyay, Myanmar, (3) Department of Geography, National University of Singapore, Singapore 119260, (4) Department of Geographical and Earth Sciences, University of Glasgow, Glasgow, G12 8QQ, UK. (5) Department of Geography, Yangon University, Yangon, Myanmar, (6) Department of Geography, Mawlamyine University, Mawlamyine, Myanmar.

The Eastern Himalayas/Tibetan Plateau are drained by six major river systems and two of these, the Ganges/Brahmaputra (G/B) and the Irrawaddy/Salween (I/S) debouch into the eastern Indian Ocean. These two systems are thought to deliver close to half of the current flux of water, sediment and dissolved load from the Himalayas and Tibet to the ocean, with ~20% of this attributed to the I/S. However, the Irrawaddy and Salween rivers of Myanmar are the least well documented of any major global river system. Although typically ranked as 4th or 5th in terms of suspended sediment load (265 Mt/yr) (Milliman and Meade, 1983; Latrubesse et al. 2005), the Irrawaddy is probably second highest in terms of suspended sediment load due to damming on other major Asian rivers. The mass fluxes for the Irrawaddy are based on the report of Gordon (1885) presented to the Royal Geographical Society and no systematic study has been undertaken since that time.

We have re-analyzed the original 19th Century data, composed of 10 years of daily discharge measurements and 1 year of daily suspended sediment measurements, and have developed rating curves from the sediment flux data. We have calculated a 10-year average sediment flux of 364MT/yr for the Irrawaddy; this includes an 18% additional fine-grained correction, calculated from our field measurements, because we suspect that Gordon's sediment filtration methods omitted the >0.45 μ m fraction. Dur-

ing 2005 and 2006, we collected wet season and dry season suspended sediment and water samples from two locations on the Irrawaddy and one location on the Salween. Based on these samples and available discharge and sediment flux information, preliminary estimates for POC transport are 2.3 to 4.3 Mt/yr for the Irrawaddy (average $\delta^{13}\text{C} = -24.8\%$), and 3.0 to 3.4 Mt/yr for the Salween (-25.3%). These results suggest that the Irrawaddy/Salween system is potentially the largest 'point source' flux of POC to the global ocean. The Irrawaddy and Salween also transport 0.89MT/yr and 0.23Mt/yr of DOC with a $\delta^{13}\text{C}$ of -26.0 and -26.8% , respectively.

Significantly, the Irrawaddy and Salween punch above their weight in terms of POC yield and we attribute this to ongoing tectonic uplift and rapid landscape adjustment and denudation in the eastern Himalayan syntaxis; notably, the Salween is dominated by high relief catchments. At present, these monsoon-driven river systems represent one of the highest and little documented contributions to global particulate and dissolved transfer from the land to the ocean.

0.1 References

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