

HIGH SEDIMENT YIELD AND AN EXTRAORDINARY CHANNEL DIVERSION IN THE PATÍA RIVER, WESTERN ANDES OF COLOMBIA: AN OVERVIEW OF ENVIRONMENTAL IMPLICATIONS

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RESUMO: The Pacific rivers of Colombia are small fluvial systems with high sediment yield. The Patía River occupies a 22046 km² basin with a mean sediment load of 26.5 x 10⁶ t yr⁻¹ and basin-wide sediment yield of 1713 t km⁻² yr⁻¹. Overall, the Patía exhibits the highest sediment yield of all medium-large sized rivers of South America due to the interplay of (1) high rates of runoff (5.300 mm yr⁻¹), (2) steep relief within catchment, with narrow alluvial plains, (3) low values of discharge variability (Q_{max}-Q_{min}), (4) episodic sediment delivery due to either geologic events or climatic anomalies, and (5) soil conversion as a result of deforestation; large areas of tropical forests in the Patía catchment have been cut-off due to increasing trends in the never-ending cultivation of illicit cocaine crops. Analysis of sediment load anomalies suggest that there were two high discharge periods in the Patía River during the 1970s and 1990s, both increasing trends in sediment load coinciding with the overall decline of tropical forests due to deforestation. In the lowlands of the basin, near the Patía delta apex, a wood merchant called constructed during the seventies a 3 km-long channel (Canal Naranjo), which was dredged to connect the Patía Viejo distributary with the much smaller Sanguiangra River to the north in 1972. A temporal analysis of major morphological changes in the Patía River allow to make some generalizations: (1) prior the construction of the Canal Naranjo in 1972, the Patía Viejo distributary channel joined the Patía River at the delta apex and the whole Patía River discharge flowed to southern coast, where the active delta lobe was during this time; (2) after the construction of Canal Naranjo, some floodings events started the widening of Canal Naranjo and most of the Patía River and Patía Viejo distributary discharges started to flow in the direction of the Canal Naranjo due to differences in relief, since the Patía River in the delta apex follows an structural high; (3) during the 1979 earthquake, when a large tsunami impacted the coast, vertical elevations of the basins changed, and the Sanguiangra River captured approximately 70% of the Patía's discharge; (4) the Sanguiangra River, which was a small creek draining internal lakes in a tropical rain forest, started to increase its water discharge from approximately 50 to 1500 m³ s⁻¹; (5) After 1990, more than 80% of the Patía River discharge was captured by the Canal Naranjo - Patía distributary - Sanguiangra River system; (6) Current conditions show that more than 90% of the Patía River flux flows to the Sanguiangra; also, the Patía River flowing to the southern coast, the retreating delta lobe, has became a dry system for almost 9 months every year. The diversion of the Patía River has caused major environmental impacts, including distributary channel erosion, sediment deposition, mangrove die-off, delta-front erosion, changes in fishing resources, transportation and communication difficulties. This is the most impressive environmental change documented for any coastal system along the western coast of South America.

PALAVRAS-CHAVE: SEDIMENT YIELD; CHANNEL DIVERSION; PATÍA RIVER.