

QUANTIFICATION OF CHANGE AND MIGRATION RATES IN THE AMAZON RIVER

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RESUMO: The Amazon River is the largest river in the world in terms of annual discharge and drainage area. After entering Brazil the river is denominated Solimões and not until the junction with the Negro River at Manaus is the name Amazonas used. The Solimões -Amazonas (Brazilian Amazon River) has been classified as having a general anastomosing pattern, while some reaches in Peru have been described as predominantly meandering and even straight. On a broader scale, the term anabranching is used to describe the planform of this large river system characterized by multiple interconnected channels. However, more detailed studies that allow a better understanding of the anabranching characteristics of different reaches of the river are still very scarce. This study aimed to estimate the percentage of change as well as migration rates of the Amazon River in two different reaches. The first reach is located in the Colombian part of the Amazon River, including an area upstream in Peru and downstream in Brazil where the towns of Tabatinga and Benjamin Constant are located. The second reach is located between the mouths of the Negro and Madeira rivers, downstream of the city of Manaus. Remote sensing image processing techniques were applied to Landsat images acquired on July 19, 1986 and June 24, 2006 for the Colombian reach and on July 16, 1978 and August 18, 2009 for the Brazilian reach. For each reach the images were selected based on similar daily water level variations, with the largest temporal variation. This gave us a maximum period of analysis of 19.9 year for the Colombian reach and 31.5 year for the Brazilian reach. In the Colombian reach we found a percentage of change of 27.1% with an annual rate of 1.4% and maximum migration rates for erosion 124.6 m yr⁻¹ and for deposition 73.9 m yr⁻¹. Between the Negro and Madeira river mouths the percentage of change corresponds to 17.8% with an annual rate of 0.6% and maximum migration rates for erosion 38.2 m yr⁻¹ and for deposition 59.3 m yr⁻¹. These rates clearly show a more active Colombian reach when compared with the Brazilian reach. Based on the data obtained and after planform evaluations, the Colombian reach suggests a laterally active anabranching pattern while the Brazilian reach has been more stable and indicates an anabranching river type 1 which is an anastomosing river.

PALAVRAS-CHAVE: AMAZON RIVER; MULTITEMPORAL ANALYSIS; ANABRANCHING PATTERN.