



Parkin G.¹, Wagner T.², **Bovolo C. I.**³, Pereira R.⁴ Impacts of human activity and climate on the hydrology and ecosystem services of forests in the Guianas on the northern rim of Amazonia. *Abstract H53G-05* presented at 2010 Fall Meeting, AGU, San Francisco, Calif. 13-17 Dec. 2010

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Abstract: Tropical deforestation is one of the main areas of international concern in relation to increases in atmospheric carbon dioxide and feedbacks between land cover and climate. The Guiana Shield region, including the Guianas (Guyana, Surinam, and French Guiana), contains one of the largest remaining continuous areas of tropical forest on the Earth, and is therefore of international importance for climate stability. Its importance to the regional climate of South America is also potentially significant, as a possible conduit for vapour transport between the Caribbean and the continental interior. However, recent studies have confirmed the paucity of reliable hydrometeorological data in the forested interior in the Guianas that could help to improve understanding of these macro-scale links as well as the more local impacts of forest activities. A new hydrological monitoring programme has been established at the Iwokrama International Centre for Rainforest Conservation and Development in the interior of Guyana to provide evidence related to the impacts of forest activities and climate on ecosystem services provided by the forest. These services include water, carbon and nutrient cycling that are essential for maintaining biodiversity and other indicators necessary for long-term sustainability of the forest environment. The Iwokrama Centre aims to test the concept of a truly sustainable forest where conservation, environmental balance and economic use are mutually reinforcing. Iwokrama is uniquely placed for this research, in that it has integral involvement of the indigenous forest communities, and is geographically situated at a transition between mature intact forest and a savannah region that is likely to be sensitive to climate change, and on a larger scale at a transition between distinctive climate types in the coastal region of the Guianas influenced by the Equatorial Trough and the Amazonian interior which experiences a more continental type climate. The instrumentation is designed to characterise these transitions in more detail at storm, seasonal, and inter-annual timescale, taking a north-south transect through the ecosystem transition zone. The instrumentation comprises two fully automated weather stations situated in the forest and on the savannah, four additional automated tipping bucket raingauges, two automated water quality monitoring probes, and five stream flow monitoring locations. Two of the monitored catchments were chosen on similar landscapes and were selected to represent different stages in the harvesting cycle. Preliminary data from the catchments are presented, showing initial comparisons across the transition zone, and

between harvested and pristine catchments, with consideration of how these relate to other comparable international forest studies in the tropical zone. These first indications of the hydrometeorological behaviour at this key location are described in the context of the larger regional climate data, and of their potential role in understanding and quantifying the forest ecosystem services within a dynamical system which includes coupled land, water, climate and human activities.