

SEASONAL RUNOFF SIMULATION FOR RIVER MAGDALENA USING CHYM-MODEL

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INTRODUCTION

- Rainfall-Runoff process is generally non-linear and time variant
- This mainly depends on catchment characteristics and climatological factors
- Prediction of runoff from rainfall is crucial for many hydrological applications



OBJECTIVES

- To learn how to run CHyM-Model
- To apply CHyM-Model to simulate daily rainfall and runoff
- To compare the seasonal flow variations spatially and temporally

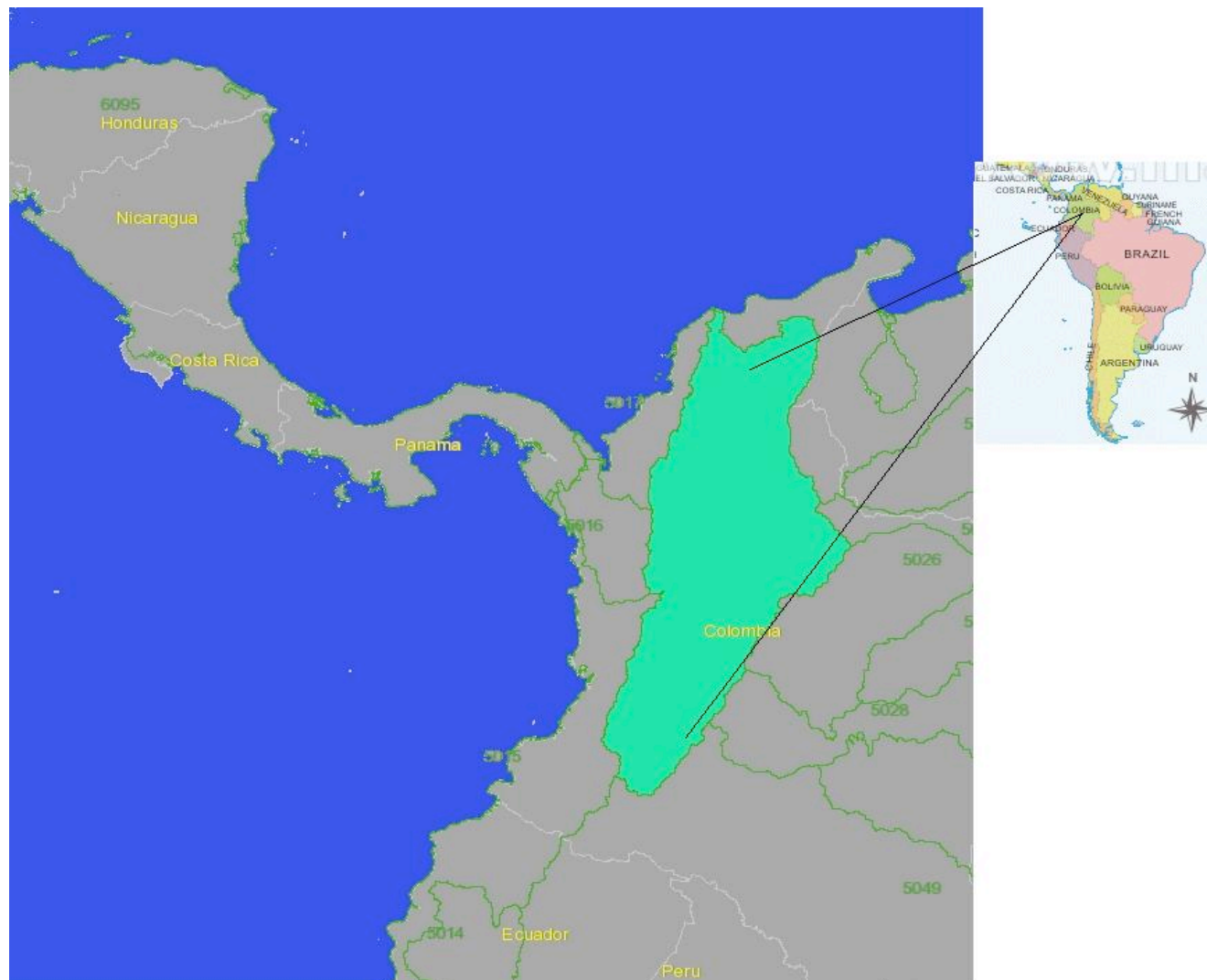


MODEL DESCRIPTION

- Physically based model
- It simulates rainfall, runoff, evaporation, infiltration
- It uses Cellular Automata algorithm for the flow convergence



STUDY AREA



STUDY AREA DESCRIPTION

- The Magdalena River is the largest river in Colombia, South America
- Drainage basin area of 250,000 km²
- The apex of the delta is about 45 km inland from the river mouth

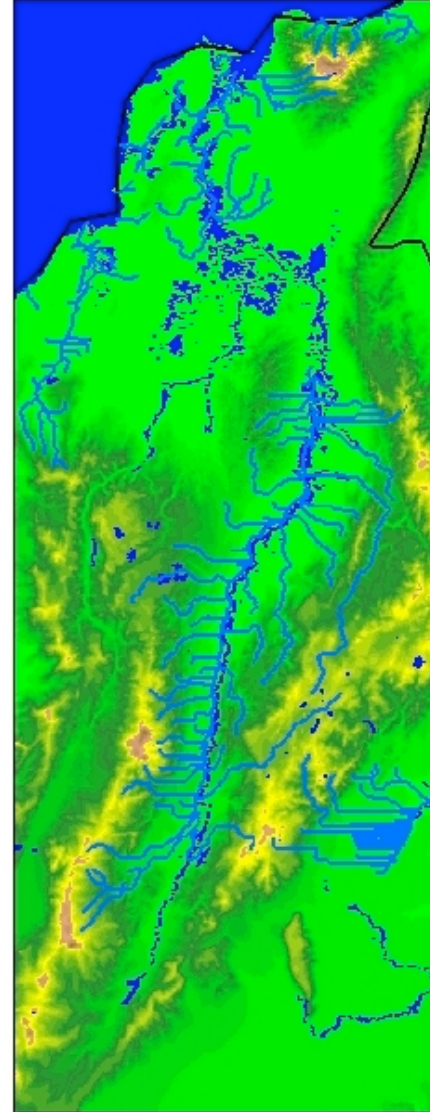
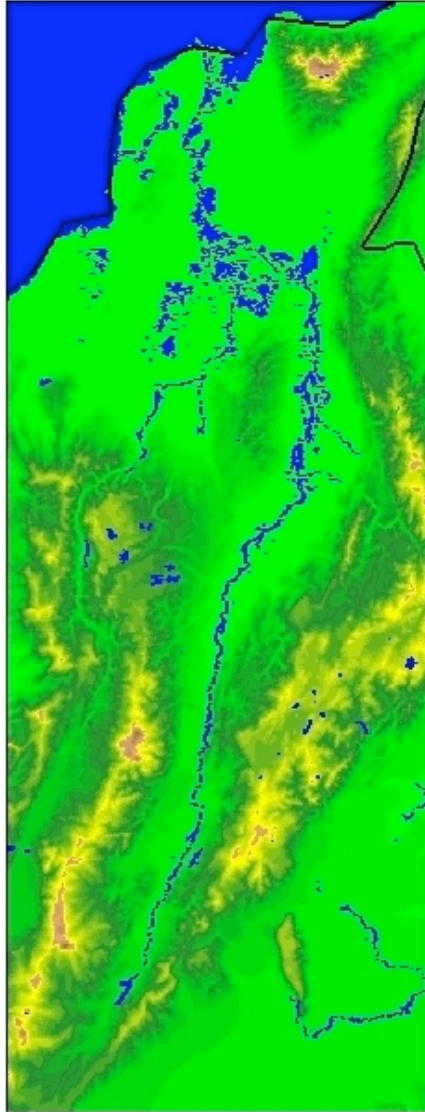


RESULTS AND DISCUSSION

DEM

10°30'N, 72°30'W

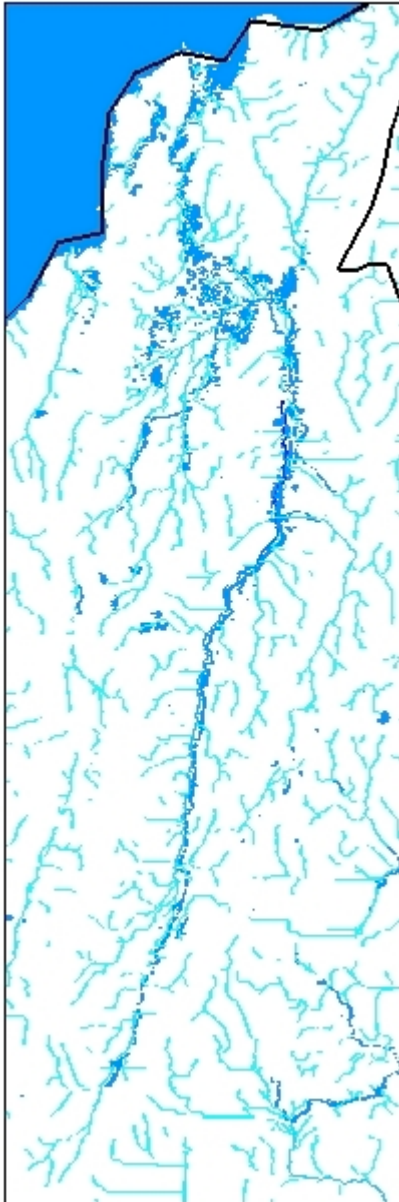
Drainage network



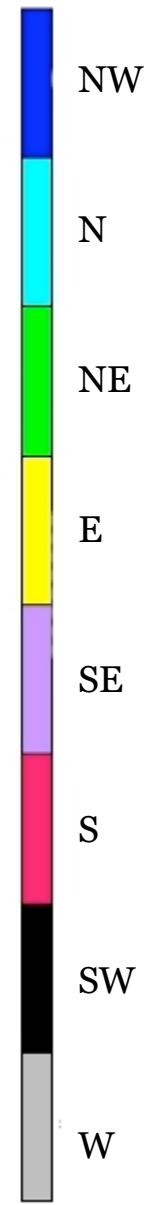
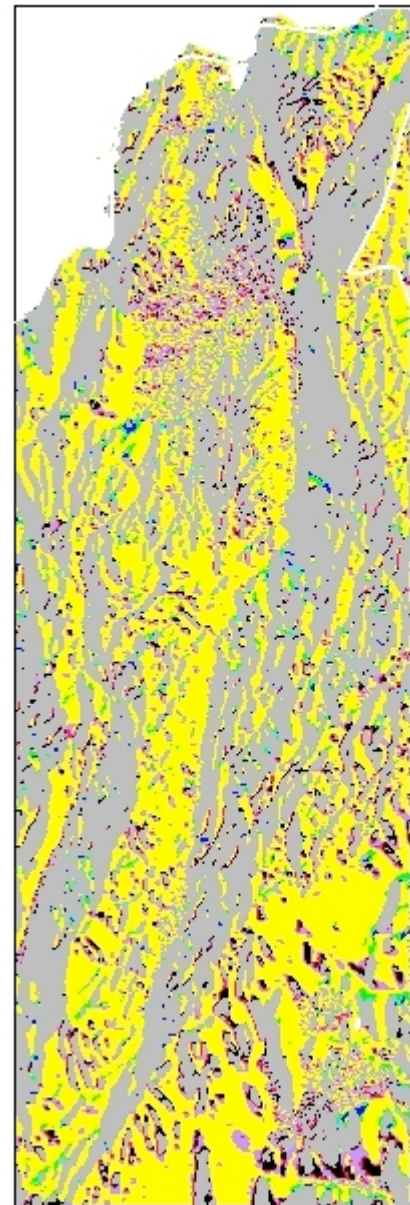
(1° 30'N, 76° 30'W)



Flow check



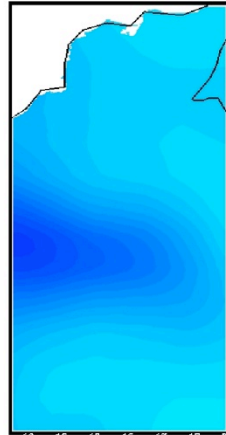
Flow direction



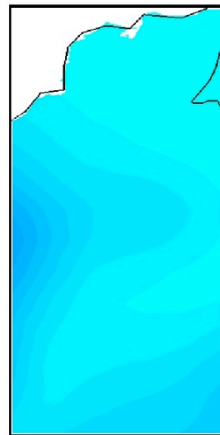
Rainfall Simulations

Summer Rainfall
(June 1990)

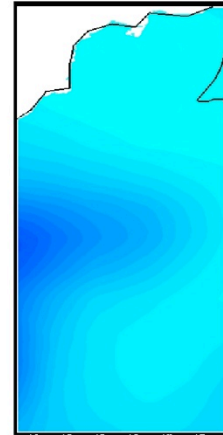
1-10 days



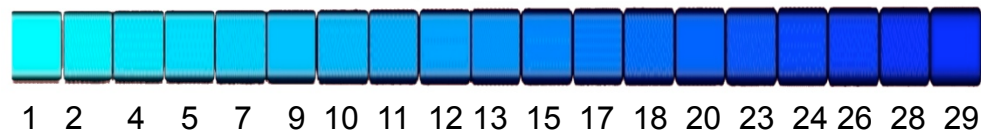
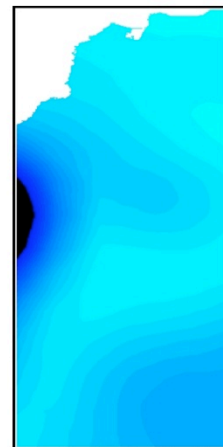
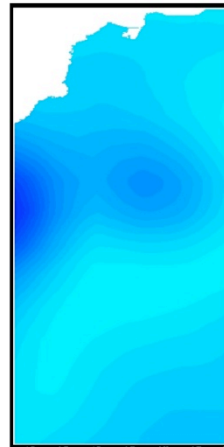
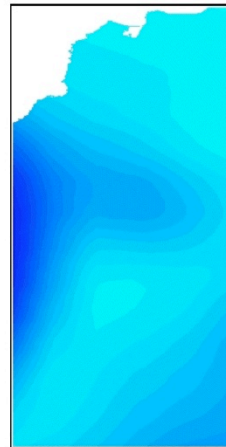
11-20 days



21-30 days



Winter Rainfall
(December 1990)



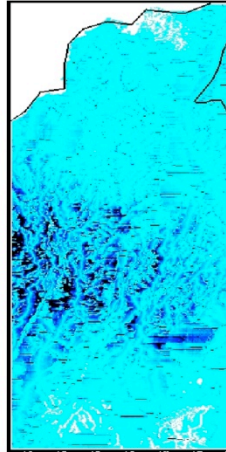
mm



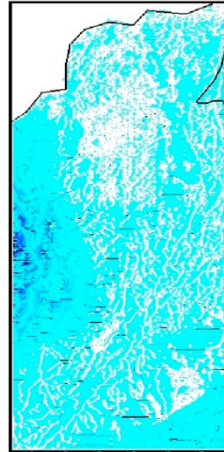
Runoff Simulations

Summer Runoff
(June 1990)

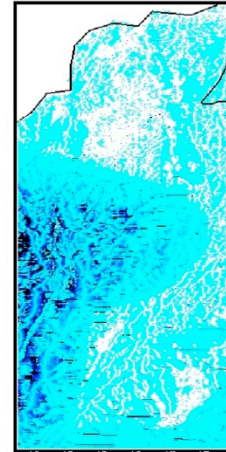
1-10 days



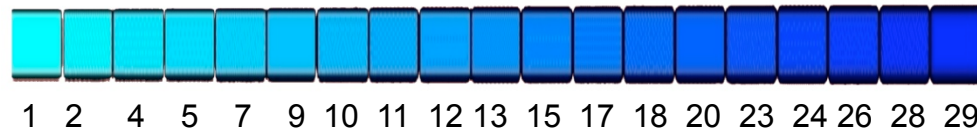
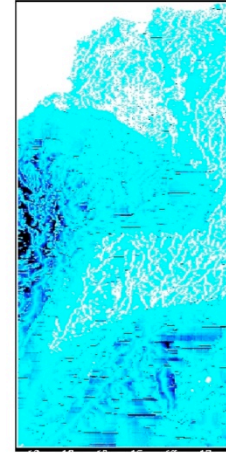
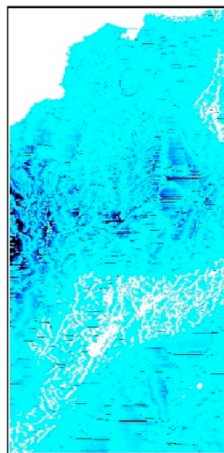
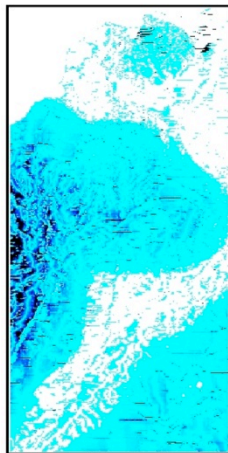
11-20 days



21-30 days



Winter Rainfall
(December 1990)



m^3/s



FINDINGS

- Winter is drier compared to summer
- Pattern of flow discharge follows the pattern of rainfall
- Some part of rainfall may be related to orographic effect



CONCLUSIONS

- CHyM-Model simulation is found to be suitable for the selected basin
- Clear Flow pattern is derived for the catchment
- Results can be applied for flood control, flow regulation works
- It can be applied for different time scales for different catchments to maximize skill
- It can be applied for Global climate change prediction







THANKS FOR YOUR ATTENTION