

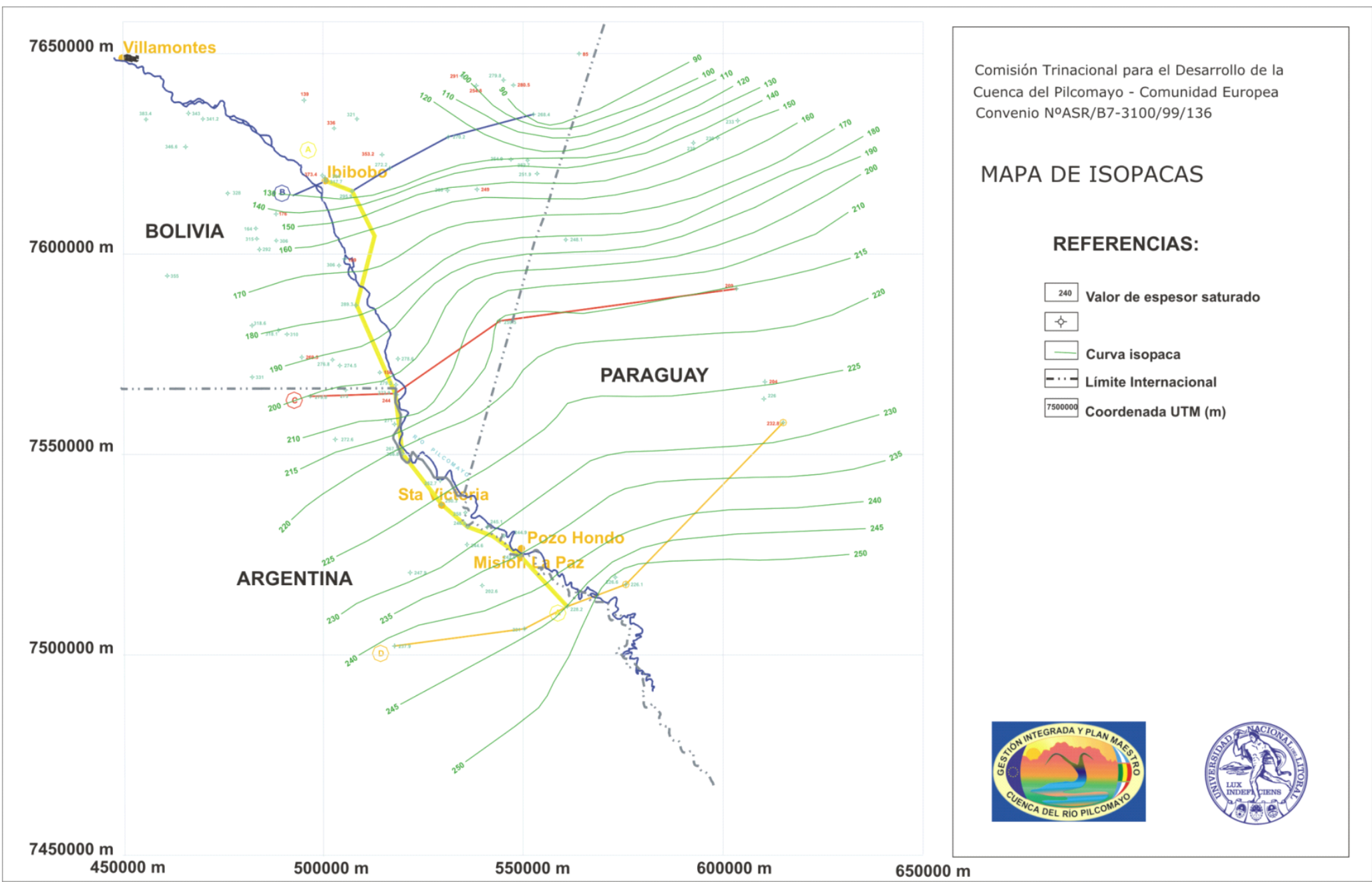
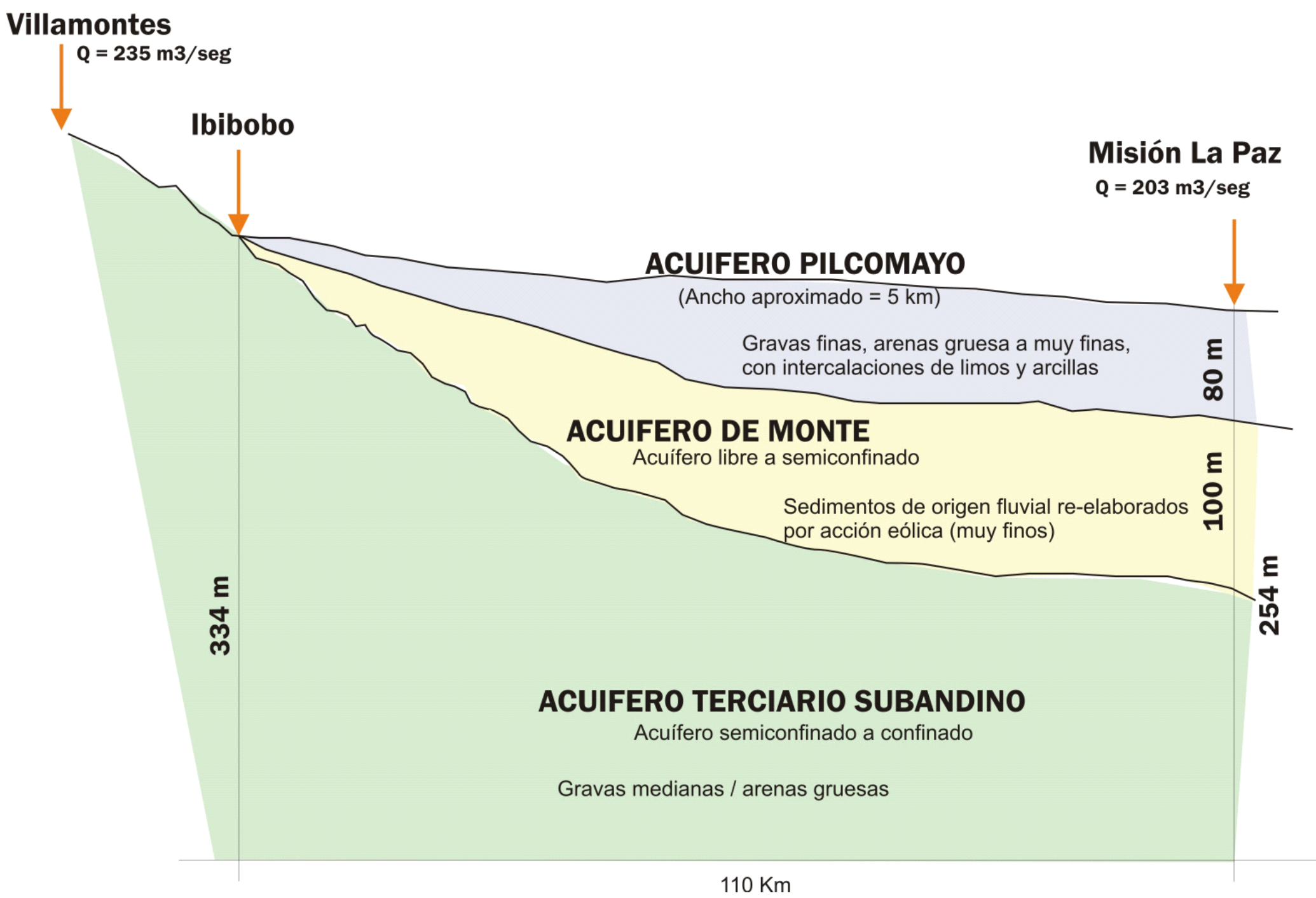
transboundary aquifer yrenda-toba-tarijeño (Argentina-Bolivia-Paraguay)

GROUNDWATER - SURFACE WATER INTERACTIONS

Ofelia Tujchneider | Marcela Pérez | Marta París | Mónica D´Elía

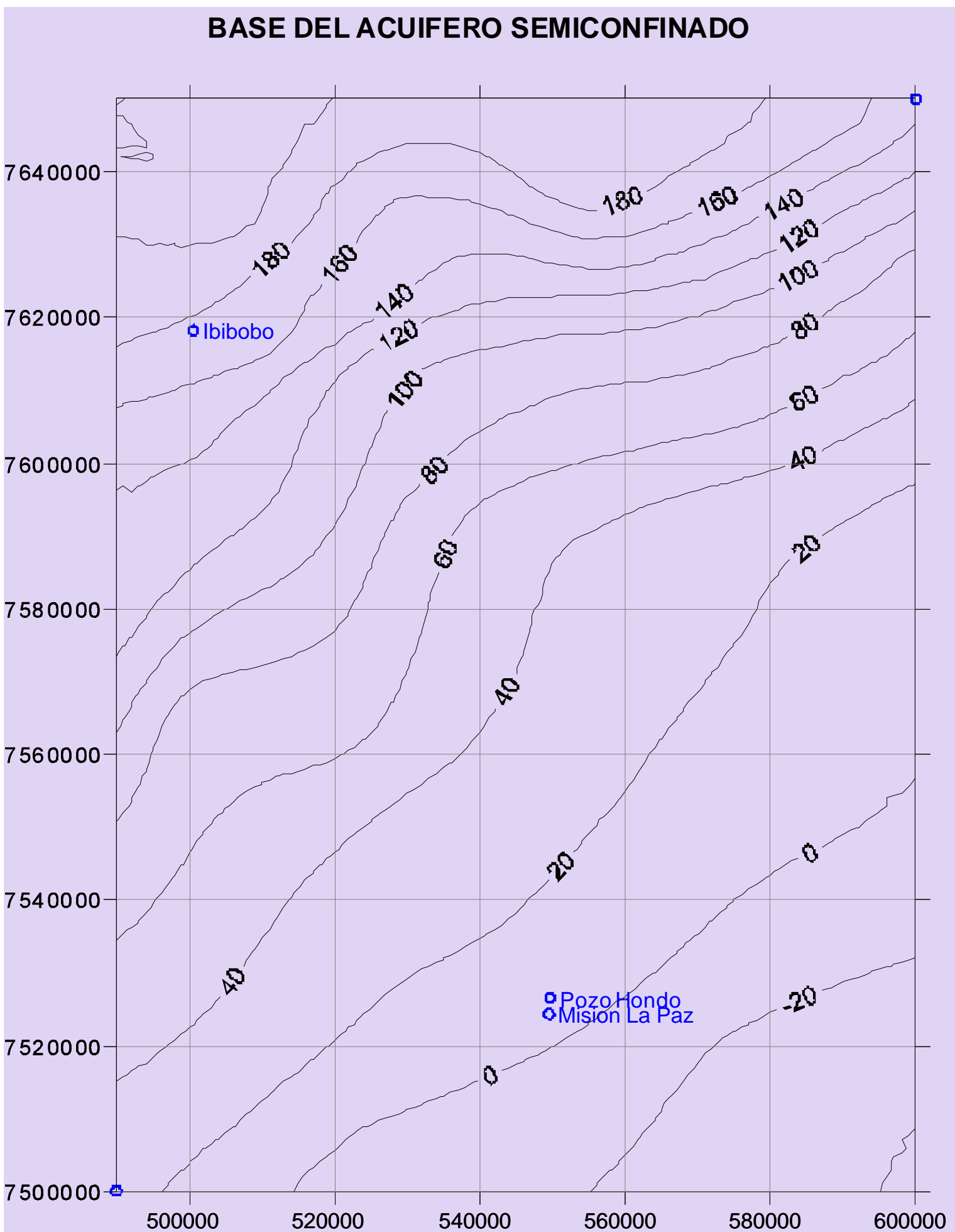
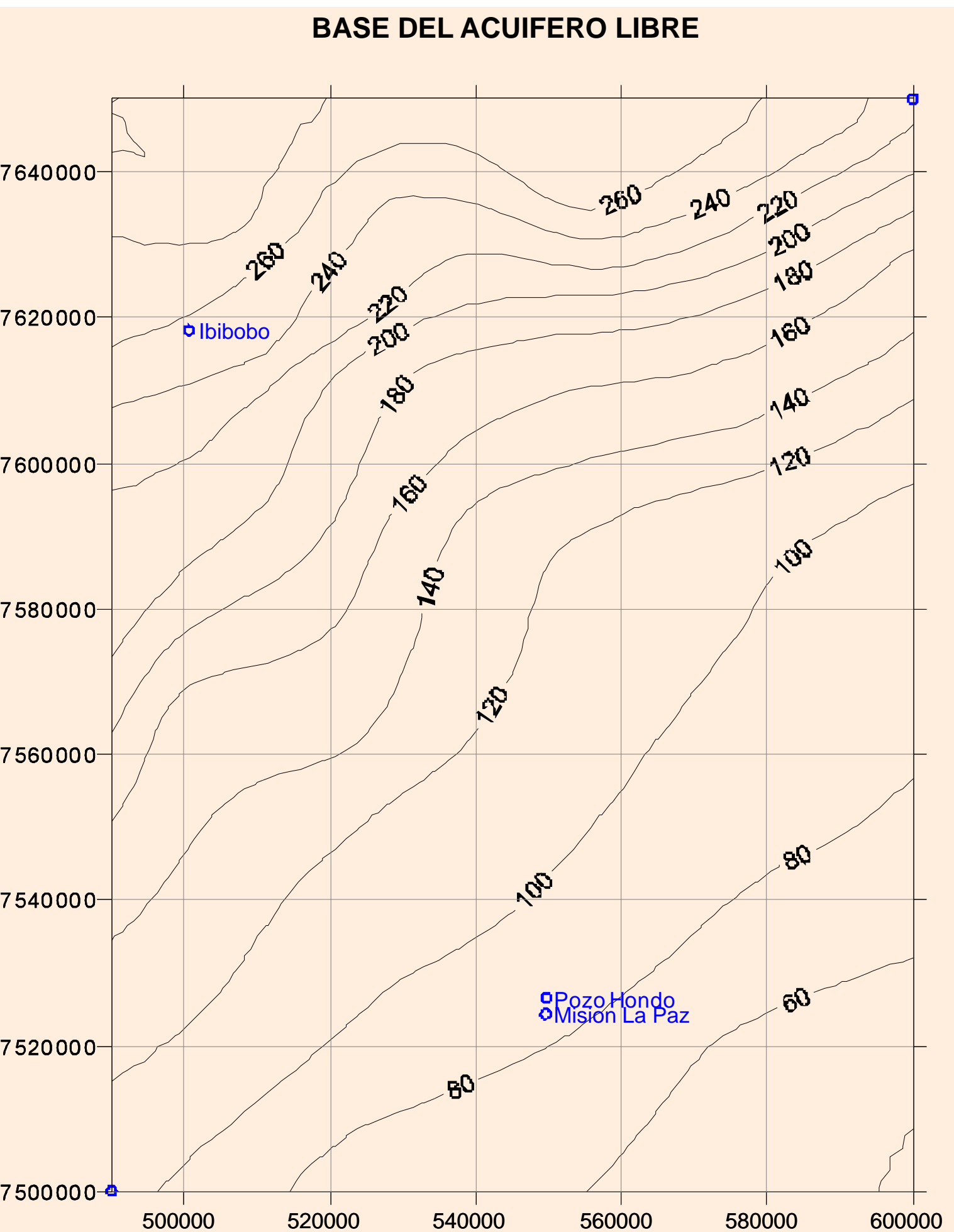
HIDROLOGICAL CHARACTERIZATION OF THE ALUVIAL FAN

OF THE PILCOMAYO RIVER | MATHEMATICAL MODELLING



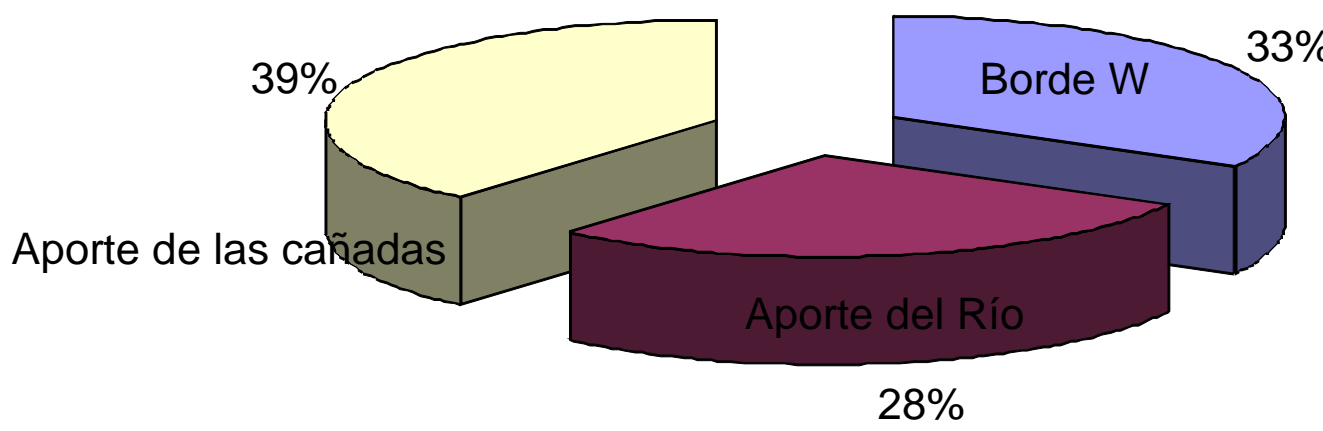
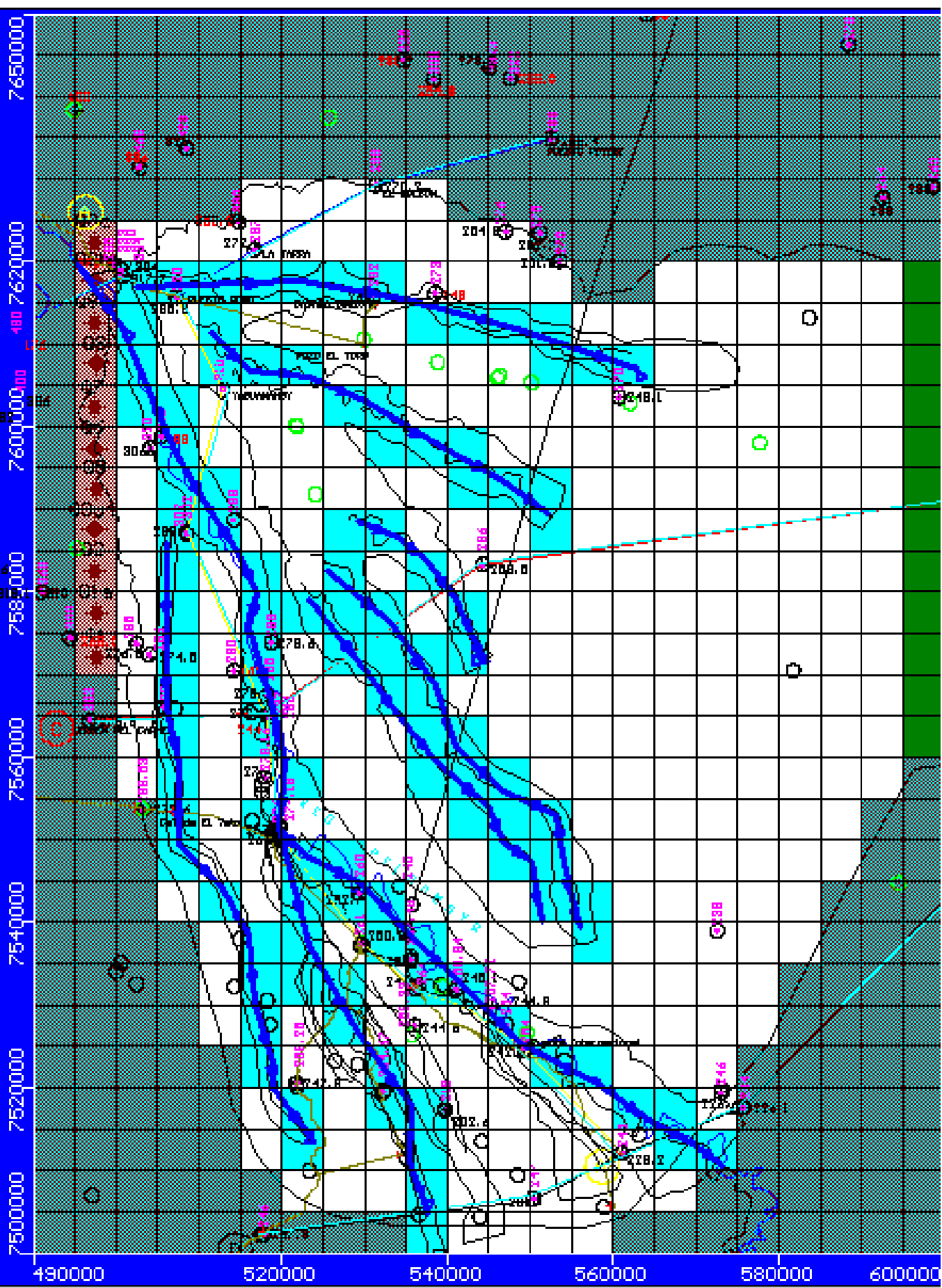
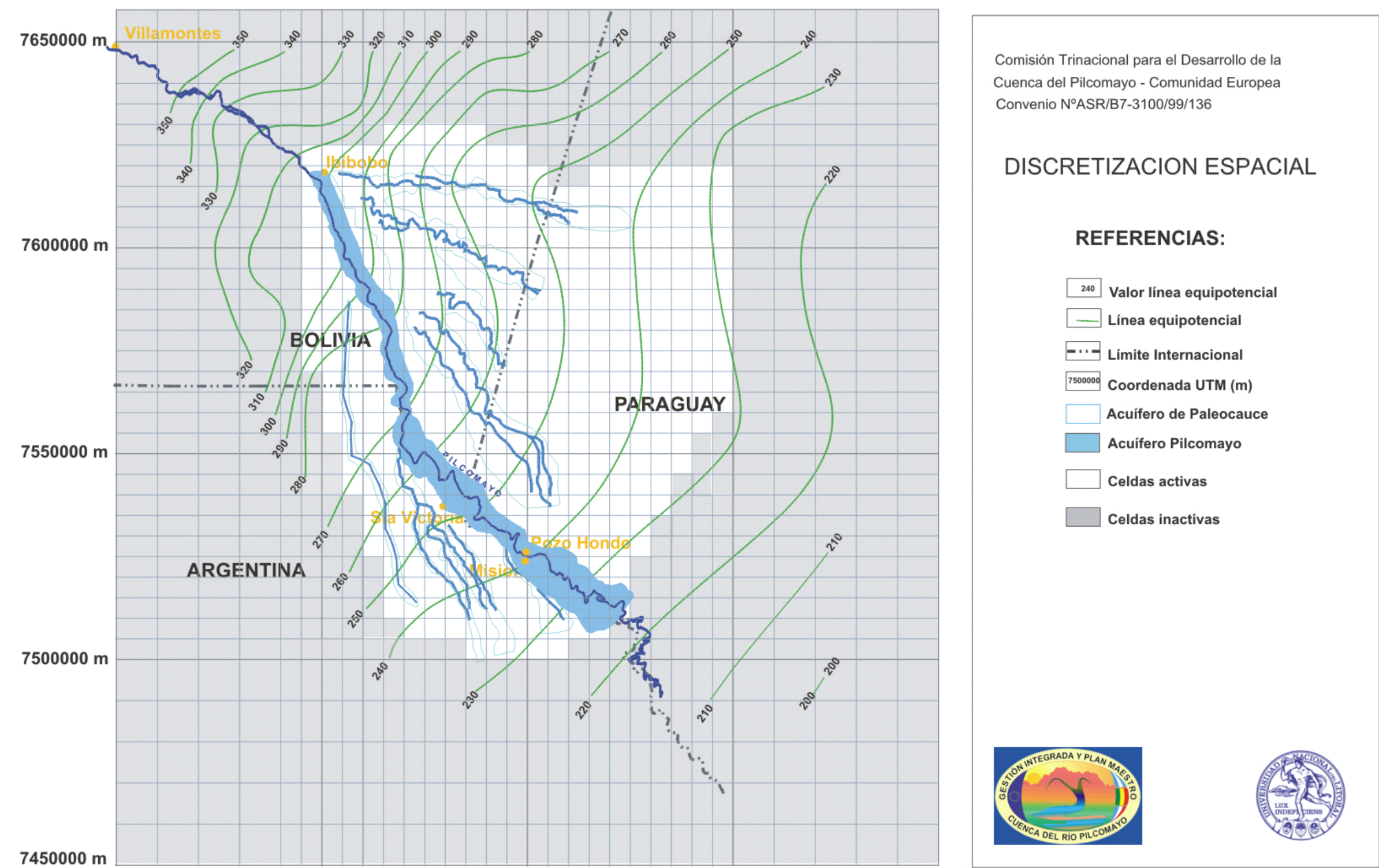
GEOLOGY & HYDROGEOLOGY

GEOMETRY OF THE AQUIFER SYSTEM

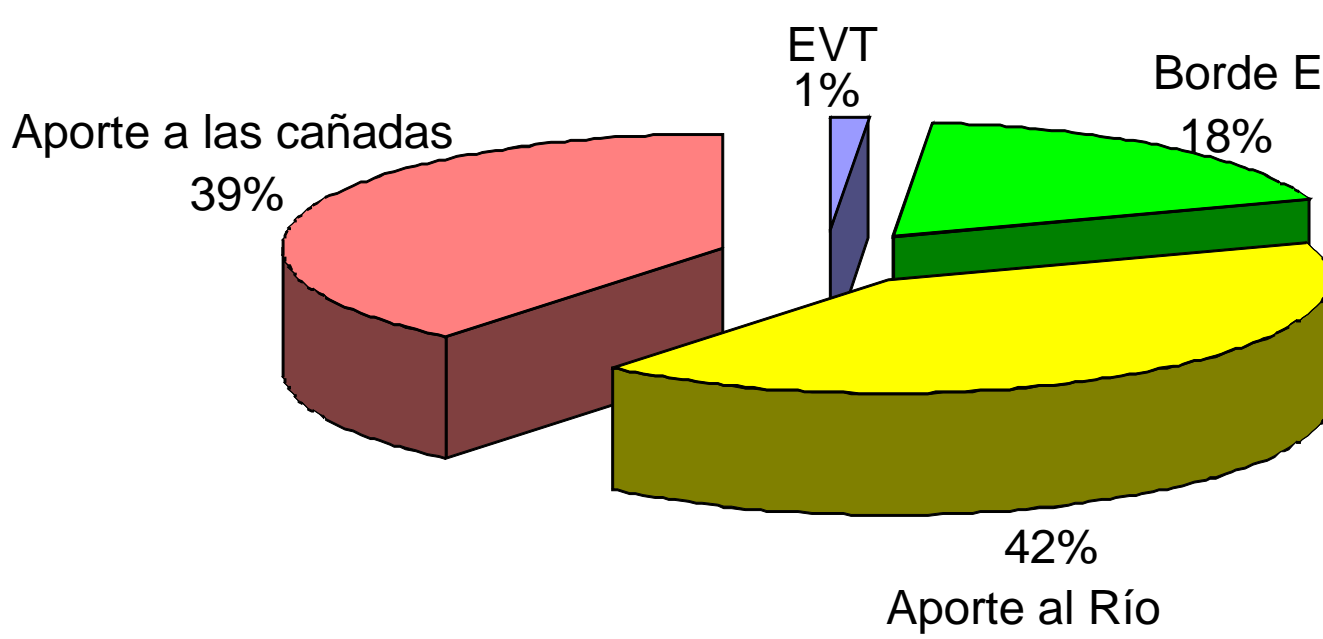


PRELIMINARY MATHEMATICAL

MODELLING | 5Km CELLS

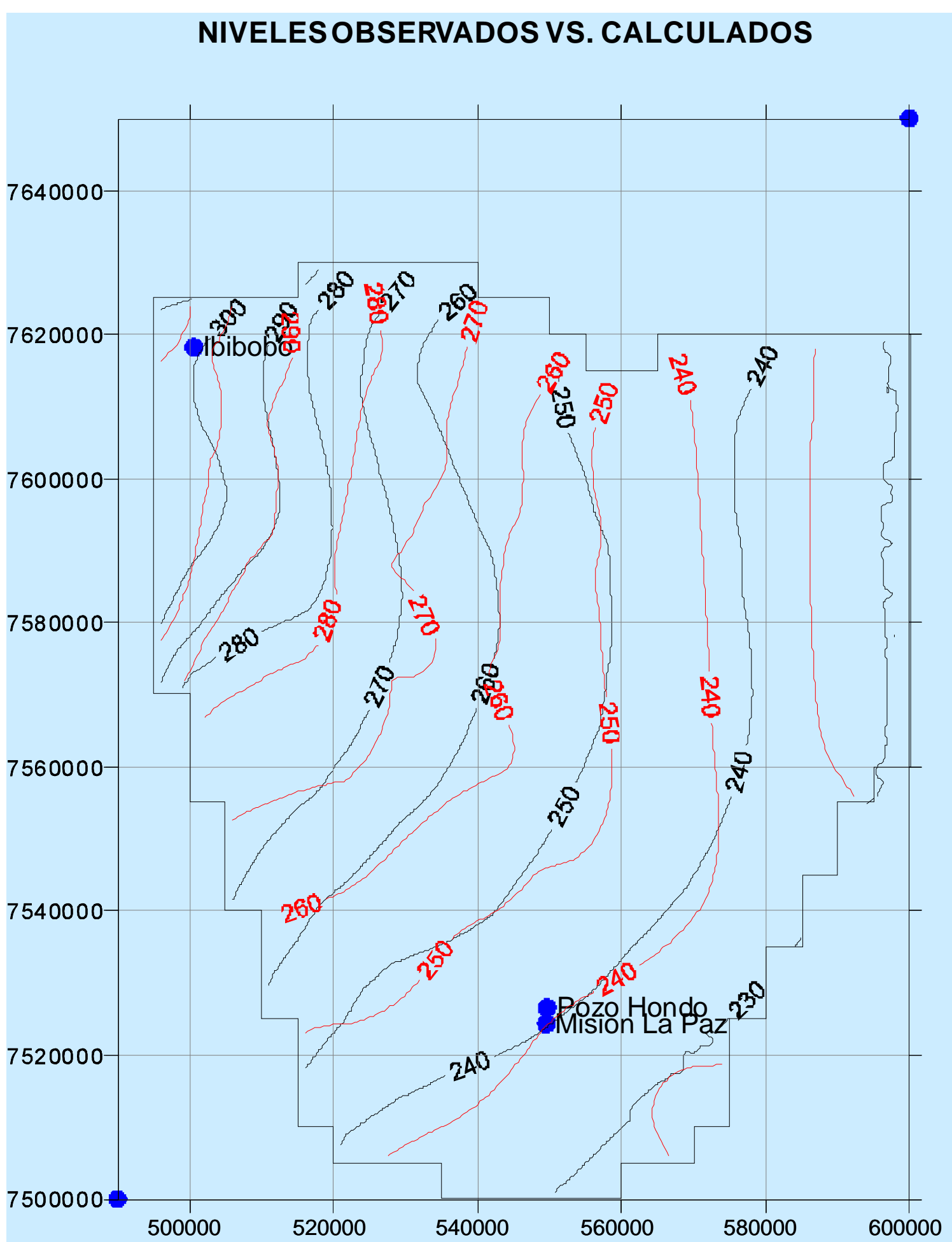
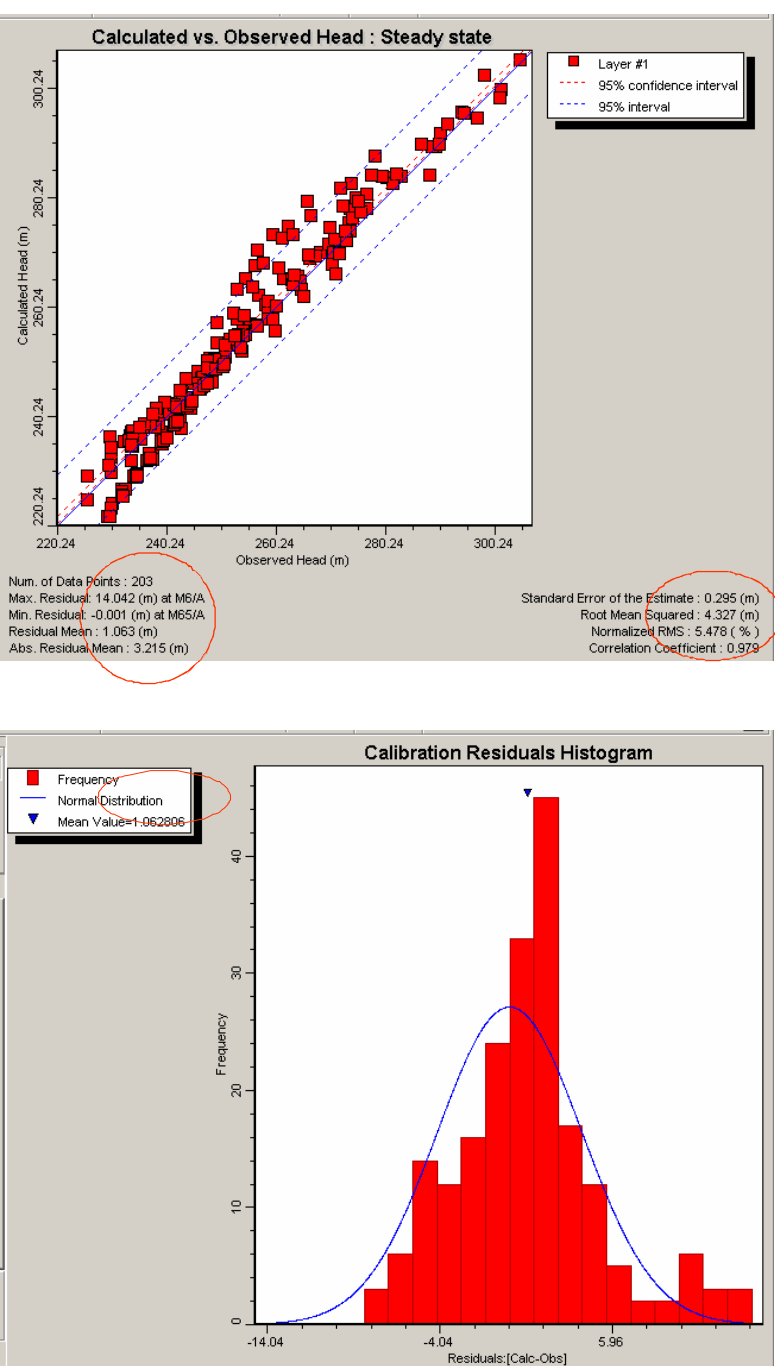


INPUTS



OUTPUTS

CALIBRATIONS



Yrenda – Toba – Tarijeño Transboundary Aquifer System, South America: groundwater – surface

water interaction.

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**Abstract:** This paper presents the results of the activities carried out for the hydrogeological assessment and subsequent mathematical modeling of the groundwater flow in the transboundary aquifer system located beneath the alluvial fan of the Pilcomayo River between Ibibobo and Misión La Paz – Pozo Hondo (Argentina, Bolivia and Paraguay, South America). The aquifer system has an area of about 300,000 km<sup>2</sup>, fact that should be corroborated, since its limits should still be verified. For elaborating the preliminary conceptual groundwater model, the geologic formations of the Tertiary and Quaternary period were taken into account as the stratigraphic sequence of hydrogeological interest. Jointly with the groundwater table map, available from previous works, the piezometric surface was quantified. Hydraulic gradient, hydraulic parameters, and groundwater velocities and flows were estimated. Using the analyses of both the geologic and hydrodynamic information, the preliminary conceptual groundwater model was defined, and it was possible to corroborate that the aquifer system behaves hydraulically as a multiunit. The construction of the mathematical model required a careful selection of the data because of the scarce basic information available according to the extension of study area and the purposes of the work. The calibration is well-considered because of the normalized root square error obtained (approximately 5%). The groundwater flow was clearly defined and it was also possible to quantify the bidirectional relation between surface water and groundwater. This fact had not been considered so far in earlier studies. Continue working on these bases will be essential to generate the plans for regional development and appropriate legal tools for the utilization and sustainable management. As a result of that, it will be possible to protect biodiversity, prevent desertification and identify and prevent the effects of the climate change. All of this will be a genuine benefit to the inhabitants of this vast region.

**Keywords:** conceptual model, mathematical model, transboundary aquifer, South America

