



A regional hydrogeological model for the Basin of Mexico

J. Carrera-Hernandez(1,2) and S. J. Gaskin(1)

(1)McGill University, (2) International Institute for Applied Systems Analysis (IIASA)
(jaime.carrera@mail.mcgill.ca)

The Basin of Mexico is home to more than 20 million people, as Mexico City and its Metropolitan Area (MCMA) is located in it. The Basin's aquifer system provides nearly 70% of the total water supply to its inhabitants, a dependence that has caused land subsidence of up to 30 meters in some areas during the XXth century, with draw-down rates of nearly 3 m/yr. Despite the importance of the Basin's aquifer system, to date no regional analysis has been undertaken as the existing studies have focused on the southern-most area of the Basin, where part of the MCMA is located. To overcome this problem, the present work used previous geophysical studies, surface geology and well lithology to develop a regional three dimensional groundwater flow model for the Basin of Mexico. A new database, called the Basin of Mexico Hydrogeological Database (BMHDB) was developed in a Relational Database Management System in order to efficiently handle the large amount of data required in this study. The model also incorporates the effect that land cover change has had on aquifer recharge through the development of a simple daily soil water balance from 1974–1989 which is used as boundary condition in the regional groundwater flow model. Two different land cover maps (1978 and 1985) were used to develop the regional soil water balance model, which used the Penman-Monteith equation in order to compute Actual Evapotranspiration (ET). The regional groundwater flow model will be a helpful tool to develop groundwater management policies and represents the first effort in developing a regional model in the Basin.