A survey of hydrologic conditions in the Gurabo-Juncos valley was conducted on March 25, 1988 in cooperation with the Puerto Rico Department of Natural Resources and the Puerto Rico Aqueduct and Sewer Authority. The objective of the survey was to define the potentiometric surface (water level) in wells, the alluvial aquifer, and to estimate the seepage between the aquifer and the streams. The survey included measurements of ground-water levels in wells, instantaneous discharge at selected sites along the principal streams, and ground-water pumping rates. The survey was conducted during a period when streamflow was approaching base-flow conditions. The Gurabo-Juncos valley covers approximately 44 square kilometers and is surrounded by igneous rock formations. The alluvial aquifer generally occurs under unconfined conditions but may be confined locally by surficial clays. The alluvial deposits, which are composed of interbedded layers of gravel, sand, and clay, reach a thickness of about 45 meters along the center of the valley. The alluvial deposits continue down the valley toward Rio Gurabo. The direction of ground-water flow in the valley is indicated on this map by flow lines perpendicular to the approximated potentiometric-surface contours. As shown by the flow lines, the direction of ground-water flow generally is down the valley and toward Rio Gurabo. Discharge measurements along the streams indicated a net gain in streamflow of 0.09 m³/s (public metric tons per second) which implies that the aquifer generally discharges to the stream. Some reaches of the stream, however, appear to be recharging. The discharge of river water tends to be lowed by pumping or by the effects of elevated mainlines. Total ground-water withdrawal in the valley was estimated at 10 ML/d (million liters per day). Ground-water withdrawals are primarily for public supply (3.67 ML/d), dairy farms (0.34 ML/d), and domestic supply (0.09 ML/d). During March 1988, precipitation and streamflow were relatively low. Precipitation for the month totaled 36.6 and 16.0 millimeters at Gurabo Substation and Juncos (U.S. Weather Service stations, respectively, with most of the rainfall occurring during the last week of the month (fig. 1A). The flow of Rio Gurabo peaked at a discharge of 1.38 m³/s on March 3 in response to a rainfall that occurred through much of March. At the time of the survey on March 25, the instantaneous flow of Rio Gurabo was 0.64 m³/s concurred with the minimum mean daily discharge for the month (fig. 1B). Ground-water levels also declined through the month of March as shown in the hydrograph for the observation well at Gurabo (fig. 1C). The water level in this well was about 0.5 meter lower at the end of March than at the beginning of the month. The hydrograph for this well does not reflect the peaks in rainfall and streamflow during March because ground-water levels are generally slow to respond to rainfall and river stages.
Figure 1.—Precipitation, runoff and the ground-water level fluctuations in the Gurabo-Juncos valley during March 1988: (A) daily precipitation at Gurabo Substation and Juncos INNE weather stations, (B) mean daily discharge at Rio Gurabo at Gurabo station, (C) mean daily ground-water level at Gurabo observation well.