then used to estimate the location of groundwater table and specific yield. To verify the ERT results, we compared our groundwater level estimation to the data from the nearby observation well. We then applied the correction coefficient K_s=0.98 to estimate the regional groundwater level, which yielded the least average error (about 0.25 meters) relative to the observed groundwater levels. In March 2017, the groundwater level in the Minzhu Basin was about 8.5-m to 15.8-m in depth. In June, the groundwater level increased significantly due to the wet season, which was about 4.6- to 15-m in depth. The groundwater level in August remained at about 3.4- to 13.9-m, while the groundwater level in September was between 4.8- and 14.2-m. In summary, the groundwater level in the dry and wet seasons decreased gradually from the upstream to the downstream of the Zhuoshui river. However, there were three profiles (Min_02, Min_03, and Min_06) which showed a smaller difference in the groundwater level between the wet and dry seasons, compared to the other survey lines. This trend of groundwater distribution is observed at locations that are normal to the river direction. From the specific yield estimations, the upstream section of the survey area and the area near the Zhuoshui river channel have higher specific yields, whose values are above 0.20. The middle and lower reaches have smaller specific yields, which are about 0.12 to 0.16. In addition, Min_03 and Min_06 have the lowest specific yield and a smaller difference in the groundwater level, compared to the adjacent area. It might be related to the hydrogeological structure of the fault damage zone of the Chi-Chi earthquake. Our future work will focus on the characterization of this damage zone and determination of its hydrogeological properties.

Key Words：electrical resistivity tomography, groundwater, specific yield, Minzu basin.

一、前　言

本研究採用二維時序地電阻量測方法，嘗試藉由地電阻剖面監測資料，於臺灣中部名竹盆地區域，重建豐枯不同季節之地下水位面區域分佈，以及非拘限含水層的比出水率等水文參數。

地電阻影像法在水文地質相關的應用研究，最近十年已有相當多的例子。例如Meads et al. (2003)曾經利用地電阻影像法描繪河道與附近掩埋場的情況，Michot et al. (2003)則應用地電阻法監測土壤中的含水量，Bentley and Gharibi (2004)利用二維及三維地電阻影像探討整治場址，Berthold et al. (2004)整合水文地質與地球物理於加拿大平原進行地下水補注之研究，Rayner et al. (2007)則利用地電阻影像法在脆弱的水文地質背景下了解含水層構造。

而在國內研究方面，董等人(1995)曾進行屏東平原基盤之大深度地電阻探測，結果顯示平原區沖積層厚度約介於100至300公尺之間，而基盤深度有逐漸自北向南變深的趨勢，研究的結果協助提供了水文地質模型建立之參考依據。劉(2007)則在嘉義汴頭地區，運用地電阻法，進行淺層地下水位面偵測之研究。姚(2007)利用地電阻法於崩積層進行含水特性調查，並初步測試地電阻用於含水量監測之可行性研究。黃(2008)也曾應用三維地電阻方法，評估運用三維地電阻調查地下污染物的傳輸及分布之可行性。陳(2009)與吳(2012)則分別於濁水溪沖積扇北岸及南岸的彰化與雲林地區，利用高解析的二維地電阻探測方法，協助調查扇頂礫石層與扇央泥質地層邊界之區域分布，以協助定義扇頂礫石補注區邊界。張等人(2013)更曾利用地表地電阻方法，配合觀測井水位資料，於濁水溪沖積扇上游地區沒有觀測井的區域，重建地下水位面分佈。由於地電阻方法在地下電性地層的解析上，有著良好的效果，加上屬於非破壞性的地下探勘方法，選址上較不受用地取得許可限制，可以取得空間分佈上較為密集的量測資料。因此本計畫嘗試利用地電阻方法，進行時序監測；並利用簡單未飽和層模型假設，客觀推估區域地下水位面季節分佈的變動，並推估比出水率之分佈情形。

二、施測原理與儀器

地電阻探勘法係利用直流電或低頻交流電流，經由一對電極(A、B)通入地下，建立人工電場。並利用另一對電極(M、N)測量空間之電場電位差(如圖一)，計算地層的視電阻率(apparent resistivity)。而視電阻率量測值，