Supplementary Material for Maxwell et al., Evidence for Pleistocene lakes in the Tushka region, south Egypt

DATA SOURCES

Space Shuttle Radar Topographic data (SRTM) are available free of charge from several sites: a NASA site hosted by the Jet Propulsion Laboratory (JPL) and the U.S. Geological Survey (USGS) in HGT format (http://www2.jpl.nasa.gov/srtm/), from USGS Earth Explorer in BIL format (http://edcsns17.cr.usgs.gov/EarthExplorer/), and from a site hosted by the Consultative Group for International Agriculture Research (CGIAR) in GeoTIFF or ASCII format (http://srtm.csi.cgiar.org/). While all groups rely on the same source of data, there are differences in post-processing. Data available from the NASA and USGS sites are in a $1° × 1°$ box format, whereas those from CGIAR are in a $5° × 5°$ blocks (or $1°$ from King's College, London). An extensive array of processing to fill data voids has been done by the CGIAR Consortium for Spatial Information, primarily to enable hydrologic modeling with these data. See the description of processing at

http://srtm.csi.cgiar.org/SRTMdataProcessingMethodology.asp.

The work reported here is part of a larger study of both the Quaternary history and the Space Shuttle Imaging Radar (SIR) reflectance characteristics in the Kiseiba Oasis region. In that area (see Fig. 1 of the paper) SRTM data exhibit voids in areas of thick sand sheet and dune cover, where the C-band (5.6 cm wavelength) signal was absorbed by the sand. In the L-band (23 cm wavelength) data from SIR-C, the same area displays a dendritic network of channels that results from radar reflections from surface and subsurface roughness elements as well as

extremely shallow local slopes. Consequently, in constructing the DEM shown here, we used

the original SRTM data rather than a smoothed version to avoid the effects of interpolation on

local slopes. Obviously, depending on the ultimate use, either source of data would be

appropriate.

SRTM PROCESSING

We used PCI/Geomatica to produce both the DEM used in Figures 1-3, and to calculate

the areas and volumes of the proposed lakes. The DEM is a composite shaded relief layer

illuminated from the northwest (to emphasize features in the Kiseiba Oasis area), overlain by a

color-coded DEM. Area and volume calculations were made by masking out data voids,

excluding areas of the Nile valley that are below the (190 and 247 m) reference levels, and using

the residual pixels less than the reference levels as a mask for calculations. Lake areas are

simply the sum of the (90 m^2) pixels at the reference level or lower, and volumes are the sum of

the differences between the reference levels and the actual SRTM elevations. In PCI, the ARE

and VLM routines were used for these calculations.