CAMEL

Center for Ancient Middle Eastern Landscapes

http://oi.uchicago.edu/research/camel

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Over the last few years our annual report has highlighted different aspects of the work being done through CAMEL. This includes digitizing and georectifying collections of maps and satellite images housed within the Oriental Institute, acquiring and georectifying large collections of new geospatial data, and undertaking outreach through activities such as the ACCESS initiative within the Chicago Public Schools. All of these activities continued throughout 2011. However, this year I want to highlight something that is very central to the mission of CAMEL: the support that we provide to researchers who use geospatial data pertaining to the Middle East. Every year we receive hundreds of requests from researchers for advice on how to utilize geospatial data in their research, to access our extensive collections, or to use our facilities. Rather than listing every one, I highlight this important work by focusing on two particular researchers, working in different parts of the Middle East, who were resident at CAMEL during portions of this past year.

Dr. Arne Wossink was a post-doctoral scholar with CAMEL for the past two years following his graduation from Leiden University. His position at CAMEL was funded by a prestigious Rubicon Grant from the Netherlands Organisation for Scientific Research (NWO). His primary work focused on the Raniya Plain in Sulaymaniya province of the Kurdistan Regional Government (KRG) in northeastern Iraq, studying changes to the landscape of the plain over the twentieth century and its impact on archaeological heritage (fig. 1). This includes the impact of the Dukan Dam built in the region in the late 1950s, as well as later forms of agricultural and urban development. Since he already possessed a strong background in the methodologies of working with various types of geospatial data, he focused on using CAMEL's facilities, collections, and the occasional advice of CAMEL staff. Arne made use of maps and satellite imagery from CAMEL collections, complemented by travel and survey reports, and was able to evaluate the effects of development on archaeological heritage preservation across three different economically diverse zones.

Arne's research found different impacts depending on the type of development and their proximity to the lake behind the dam. Such work can help archaeologists and others in charge of cultural resource management to devise better strategies for regionally focused rescue excavations and preservation efforts not only in this particular plain, but also in similar landscapes and economic development zones across the Middle East. While at CAMEL, he also spent time working on the joint Leiden, Leipzig, and Erbil Universities project at Satu Qala in Erbil province, focusing on the lower town and the wider valley surrounding the site. Publications on both Satu Qala and the Raniya Plain were prepared while at CAMEL.

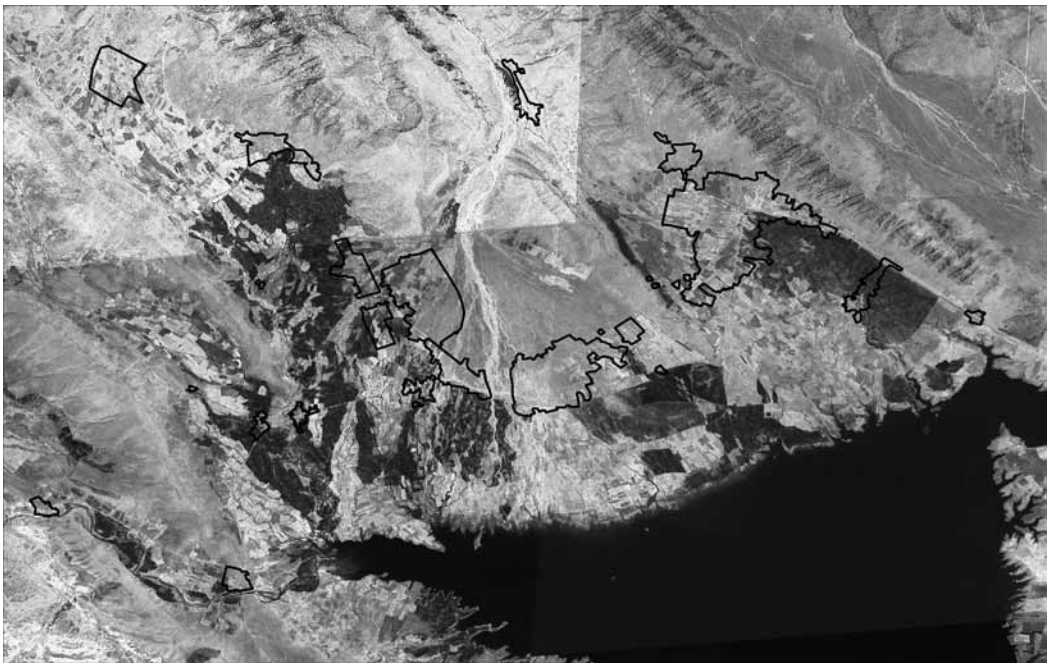

Figure 1. A portion of a 1968 U.S. Declassified Spy Satellite image showing the Raniya Plain within the Kurdistan Regional Government (KRG) in northeastern Iraq, overlain by areas indicating the defined limits of modern settlement used in Dr. Wossink's analysis. Image courtesy Dr. Arne Wossink

Meanwhile, Dr. Stephen Moshier, Professor of Geology at Wheaton College, spent part of his recent sabbatical with CAMEL investigating the hydrology of the eastern Nile Delta in Egypt. Dr. Moshier had discovered an unknown channel course, likely related to the Pelusiac branch of the Nile, in previous fieldwork as part of the Tell el-Borg Project in the northwest Sinai. The objective of his work with CAMEL was to try and trace this channel from Tell el-Borg through the Ballah Lakes and westward to the axis of the Delta. This was complicated by the presence of modern development along this line such as roads, agriculture, urbanism, and of course the Suez Canal. During his sabbatical he started with an advanced training program in GIS methods developed by CAMEL and he proceeded to develop a Digital Elevation Model (DEM) of the area based on earlier twentieth-century topographic maps in the CAMEL collections. This DEM was compared to modern SRTM and GDEM elevation models of the region publicly available. Hydrological modeling was then performed with these DEMs and possible flow routes for water were identified (figs. 2–3). A unique convergence of flow accumulation paths was identified along a course west of the Ballah depression, suggesting that this may be where the discovered channel runs farther to the west. Future cores taken from this proposed channel will allow the results of this analysis undertaken at CAMEL to be confirmed in the field.

Every year CAMEL helps scores of scholars, organizations, and interested individuals like these to undertake various forms of research and investigations. Each person comes to us with different needs and different levels of expertise and comfort in working with geospatial data. We provide facilities, training, and advice as needed. We also freely share data from our collections with people around the world, when permitted by copyright laws and ethical constraints. More and more, this data has been already digitized and georectified by

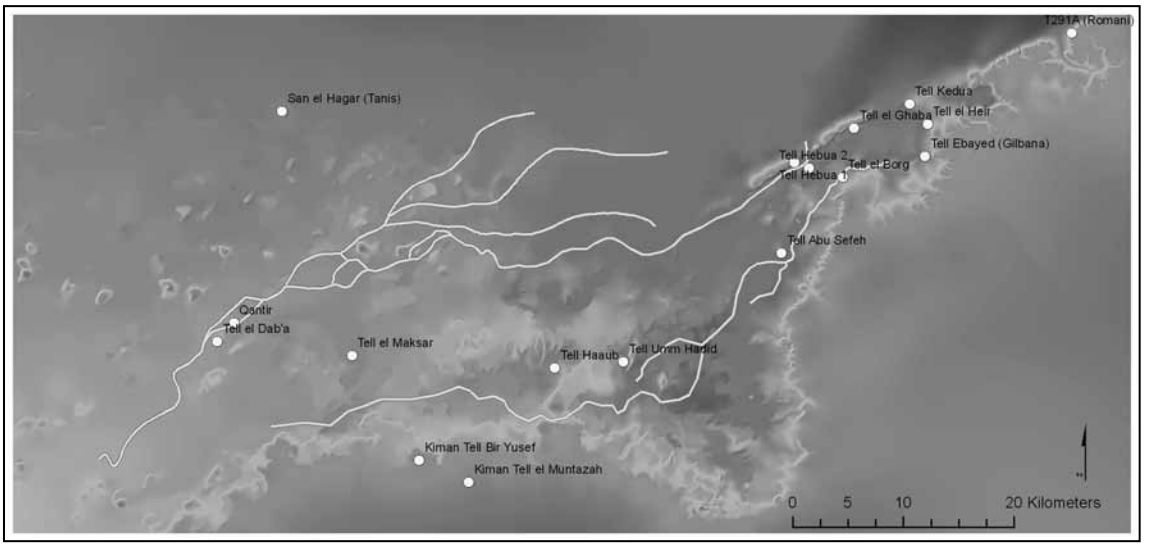

Figure 2. Digital Elevation Model (DEM) of the study region produced by Dr. Moshier from digitized topographic contours taken from a series of early twentieth-century 1:25,000 maps in CAMEL's collections. Overlain on the DEM are the results of the hydrological analysis suggesting a new channel, the southernmost branch in the image, as well as a previously defined branch to the north. Image courtesy Dr. Stephen Moshier

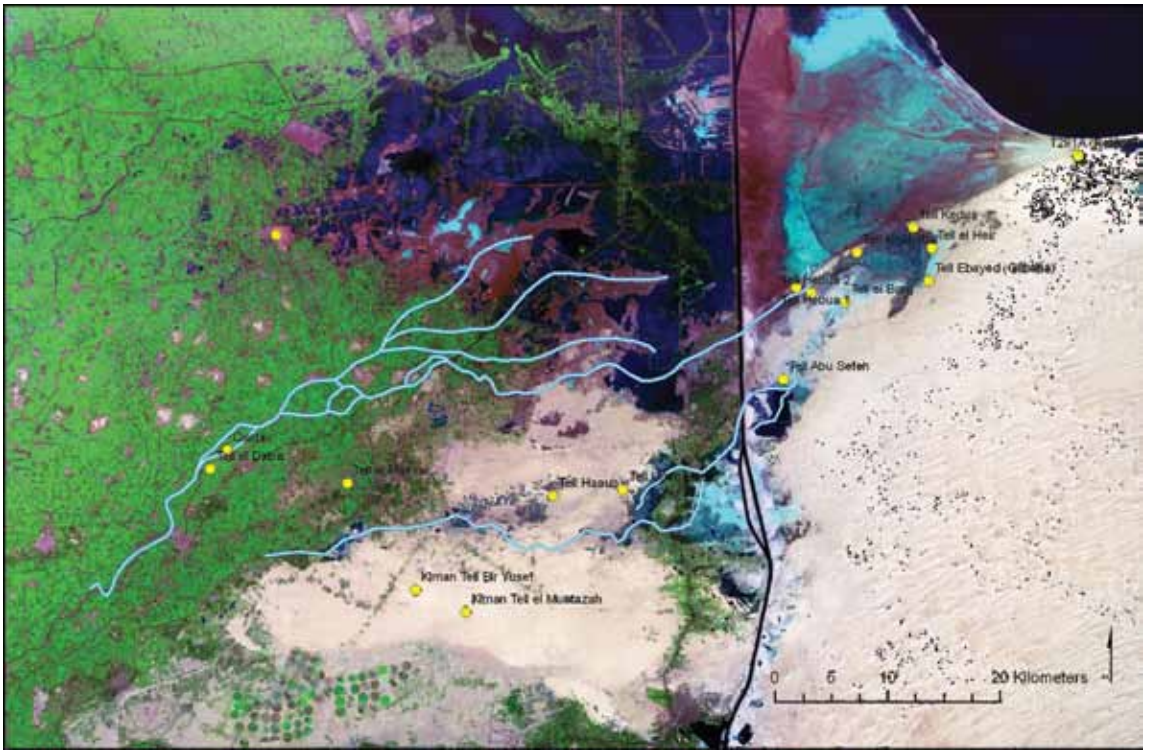

Figure 3. The same regional hydrology shown in figure 2 overlain on top of a LANDSAT satellite image to show the position of the channels relative to the modern Nile delta and the Suez Canal. Image courtesy Dr. Stephen Moshier, LANDSAT courtesy of the U.S. Geological Survey (USGS)

CAMEL staff, allowing researchers to bring together their maps and imagery without lengthy preparations and data manipulation. They can start the analysis that they need almost immediately to answer important questions of the past and present.

Unfortunately, not all our efforts to digitize external collections and make them widely available to researchers come to fruition. As reported last year, work was started on a collaborative project to digitize and georectify large portions of the map collection held at the W. F. Albright Institute of Archaeological Research in Jerusalem, as well as in other overseas research centers and institutions across the Middle East including Chicago House. This was made possible by a four-year grant from the U.S. Department of Education's Technological Innovation and Cooperation for Foreign Information Access (TICFIA) program, in which CAMEL was but one of the several participating organizations and projects. Sadly, when the Department of Education was required to make significant budget cuts this past fiscal year, they chose to completely stop the TICFIA grant in the middle of the funded project. CAMEL is currently seeking alternative funding to at least move ahead with the digitization of the 784 maps at the Albright, most of which are quite old and hard to find, that we were stopped just short of completing.

Work did progress throughout the year on georectifying our collection of U.S. Declassified Spy Satellite images as well as scores of paper maps donated to CAMEL (figs. 4–5). Almost 400 of these images were georectified this year. In addition, the 300 images that were sent to the University of Arkansas for automated georectification are available online for download through a beta version of the Corona Atlas of the Middle East (corona.cast.uark.edu). We are hopeful that the site will go live this coming year. This has brought the total percentage of our collection of the U.S. Declassified Spy Satellite images that are now georectified to over 50 percent. One of these, an image of the area of southern Iran around Persepolis taken on May 20, 1970, was installed in the Oriental Institute Museum as part of the Picturing the Past

Figure 4. One of the thousands of georectified maps within the CAMEL collections. This map, dating from 1936, was produced by the Carte des Bureau Topographique des Troupes du Levant. It shows the eastern Mediterranean coast from Beirut to Haifa

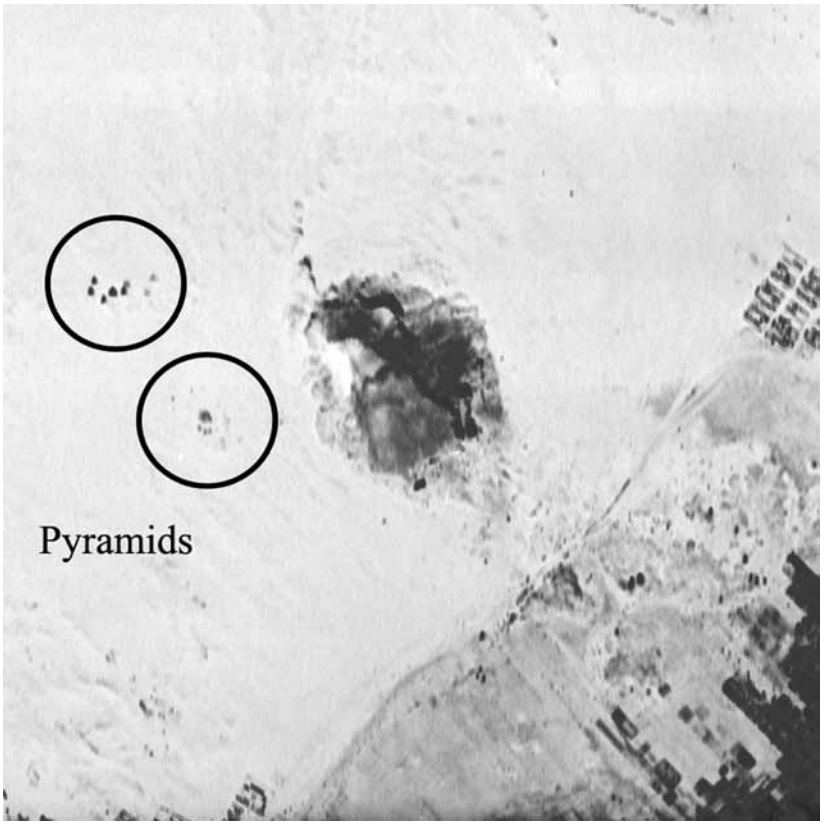

Figure 5. A portion of another 1968 U.S. Declassified Spy Satellite image that has been rectified by CAMEL. This image, taken by a CORONA KH-4B spy satellite, shows the area of Jebel Barkal in Northern Sudan. Visible in the image are fourteen pyramids belonging to the royal family members of the Meroitic Kingdom dating from the third to first century BC. Eight pyramids can be seen in the northern cluster and six more are visible just to the south

special exhibit. CAMEL staff also contributed a chapter to the exhibit catalog on aerial photographs and satellite images. Other outreach efforts by CAMEL this year included the ongoing work of corroboratively designing the curriculum for the upcoming teacher training portion of the ArcGIS Cross-Curricular Education for Sixth Grade Students program (ACCESS). This program, generously funded by the Lloyd A. Fry Foundation, is a collaborative venture with Wendy Ennes in the Oriental Institute's Public Education Department. We are expecting to undertake the teacher training program within the Chicago Public Schools during the next school year and to move from that directly into the design of new sixth-grade interdisciplinary curriculum modules in the months that follow.

CAMEL's success is a direct result of the time and effort of its dedicated staff and volunteers. Elise MacArthur and Susan Penacho served as Associate Directors this year. Sami Sweis served as Senior Supervisor. Joe Cronin, Hannah Loftus, Megan Porter, Nadia Qazi, and Allison Wood were all Student Assistants. CAMEL volunteers for this year were: Alexander Elwyn, Larry Lissak, Josh Cannon, and Nil Oktem. Without their patience and dedicated hard work CAMEL would accomplish little. We are also indebted to those who financially or through contributions of geospatial data make possible the facilities, collections and work of CAMEL.