

Israel National Report

Dr. John K. Hall — Geological Survey of Israel (Retired)

Israel National Bathymetric Survey (NBS)

The NBS, initiated by the Geological Survey of Israel (GSI), Israel Oceanographic & Limnological Research Ltd (IOLR), and the Survey of Israel (MAPI) in 2001, is essentially completed. Some 12,000 km² have been mapped with multibeam sonars, leaving only the deep waters of the Mediterranean EEZ deeper than 1,600 m, and some inshore areas along the central and southern coast, lacking only some two months of survey work.

Mediterranean:

Surveys between 15 and 700 m depth have been done along the 160 km of coast between Gaza and Lebanon with the IOLR's 15 m R/V Etziona equipped with a Kongsberg EM1002. A poster showing the results from Haifa north to Lebanon at 1:50,000 scale was published in 2005 with 440 million soundings. The back showed the backscatter results. In Fall 2010 the deeper waters to 1,600 depth (8,700 km²) were mapped with a rented 50 kHz L-3 ELAC Seabeam 3050 system aboard EcoOcean's vessel R/V Mediterranean Explorer.

The gas fields offshore Israel came online in March 2013 with the completion of Noble Energy's 150 km tie-in. New fields are under development with specific very high resolution surveys being carried out by foreign ships and AUVs. These should eventually be integrated into the DTM of Israel's offshore, which remains classified except at grid resolutions of ~50 m. The Israel Mediterranean survey is included in the European EMODnet, and we are members of Ifremer's Medimap Group and its 500 m grid.

Efforts to make the IBCM II 0.1' grid are still alive. The thrust has evolved to using the large quantity of digitized chart soundings to fill in between the 30 m ASTER2 GDEM land data and the deep water Medimap grid covering some 55% of the Mediterranean. Other obligations have sidelined this project, but it is still a primary objective. This also includes the Black Sea, which is being increasingly mapped by multibeam, and the Red Sea which is a commitment to GEBCO. Input from the hydrographic community has been minimal since the recommendations and resolutions supported by MBSHC more than a decade ago.

Geological research into the retreat of the coastal cliff and other hazards has resulted in the GSI carrying out a complete mapping of the coastal zone by LiDAR, producing a basic 50 cm grid.

Red Sea:

In 2006 the IOLR's R/V Etziona transited the Suez Canal and mapped the Israeli and Jordanian sectors of the Gulf of 'Aqaba/Elat. The data produced a 6 m grid for the inshore to about 650 m depth. A poster with the bathymetry was published at scale 1:20,000, including 3m SPOT imagery on land.

Dead Sea:

Defying the problem of sound speeds up to 1,820 m/sec (20% above that of the oceans), a 'tweaked' 50 kHz ELAC Seabeam 1050 multibeam was used to map the Dead Sea. The survey was carried out in the winter of 2006/2007 aboard the R/V Taglit, in collaboration with the Jordanians and Palestinians. The analysis required several years of 'un-tweaking' and then correction for the extensive refraction of the beams. Many artifacts were caused by the extensive submarine groundwater discharge and rapid deposition of salt on the transducer staves. However the result is a new 5 m grid based on the 40.5 million soundings.

Sea of Galilee:

In 2008 the IOLR's 9.25m jet-boat R/V Lillian surveyed the Sea of Galilee with its maximum depths of 40 m. A rented 180 kHz L-3 ELAC Seabeam 1180 multibeam was used. A poster of the resulting 6 m grid was published in 2009.

National Infrastructure

In 2007 the University of Haifa inaugurated the Charney School of Marine Sciences which now has a separate department of Marine Geophysics. Its Marine Geophysics Data Processing Lab offers students access to the digital data from the NBS, and CARIS HIPS/SIPS and Fledermaus software for reprocessing the original data. Students also use sophisticated software for the 2D and 3D seismic datasets being gathered by the oil and gas industry offshore.

Within the IOLR in Haifa the Hall Mapping Archive was also inaugurated in 2007 following Hall's retirement in 2006. It holds the marine geophysics, geology, and hydrography library acquired over the past 50 years. It is also the archive for the NBS swath data, and has a number of powerful PC work stations using GIS software as well as CARIS HIPS/SIPS and Fledermaus.

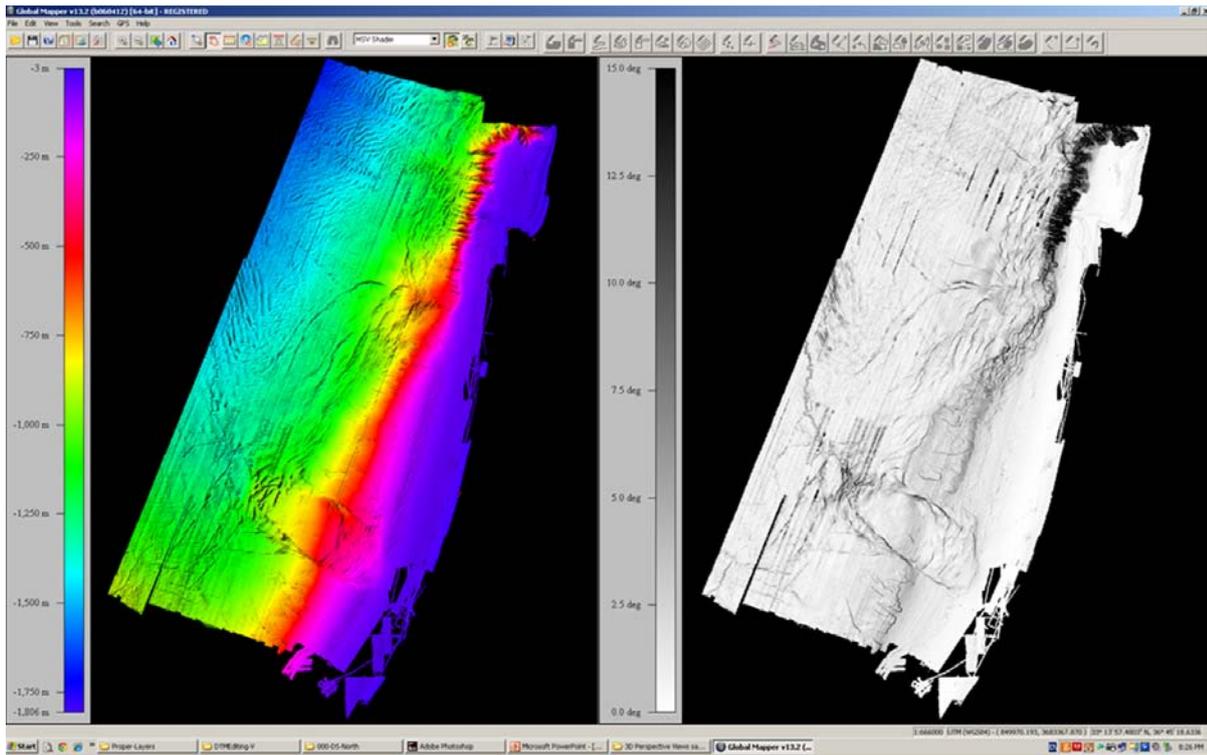
In 2012 the Dr. Hall set up the David Neev Centre for Infomatics at the Earth Sciences Institute of the Hebrew University in Jerusalem. It has 7 powerful PC work stations operating Schlumberger's PETREL software for marine seismic data, as well as GIS, CARIS HIPS/SIPS, and Fledermaus software. Other software supports LiDAR for paleoseismic studies, and scanners for bringing legacy graphical and printed material into the digital world. Scanners include a wide Contex IQ4450 wide format (110 cm) scanner, an A3 flatbed, and a Fujitsu duplex A4 sheetfed scanner. There is also a Nikon slide scanner. Servers at the IOLR and Neev Center will host in future some 40,000 scanned geophysical and hydrographic maps charts profiles and other materials for the seas around the Arabian Plate. Courses are already taught at the Centre in analysis of the local offshore marine 3D seismic data.

In 2013 Prof. Zvi Ben-Avraham, head of the Charney School, put together MERCI, — The Mediterranean Sea Research Center of Israel, under the leadership of the University of Haifa and in collaboration with the Weizmann Institute of Science in Rehovot, the Technion-Israel Institute of Technology, Bar-Ilan University, Ben-Gurion University of the Negev, the Hebrew University of Jerusalem, the Geological Survey of Israel, and the IOLR. MERCI is now joining ECORD, the European Consortium for Ocean Drilling. This collaboration also brought about a special budget from the government for acquiring a new research vessel. The likely candidate will be a 39 m German-built 22 year old vessel currently in use by the Israeli Navy. With the Kongsberg EM1002 nearing the end of its life after 15 years, a search is on for a mid-water capable (~3,000 m) multibeam (EM300/302 or Reson Seabat 7160) for the new ship.

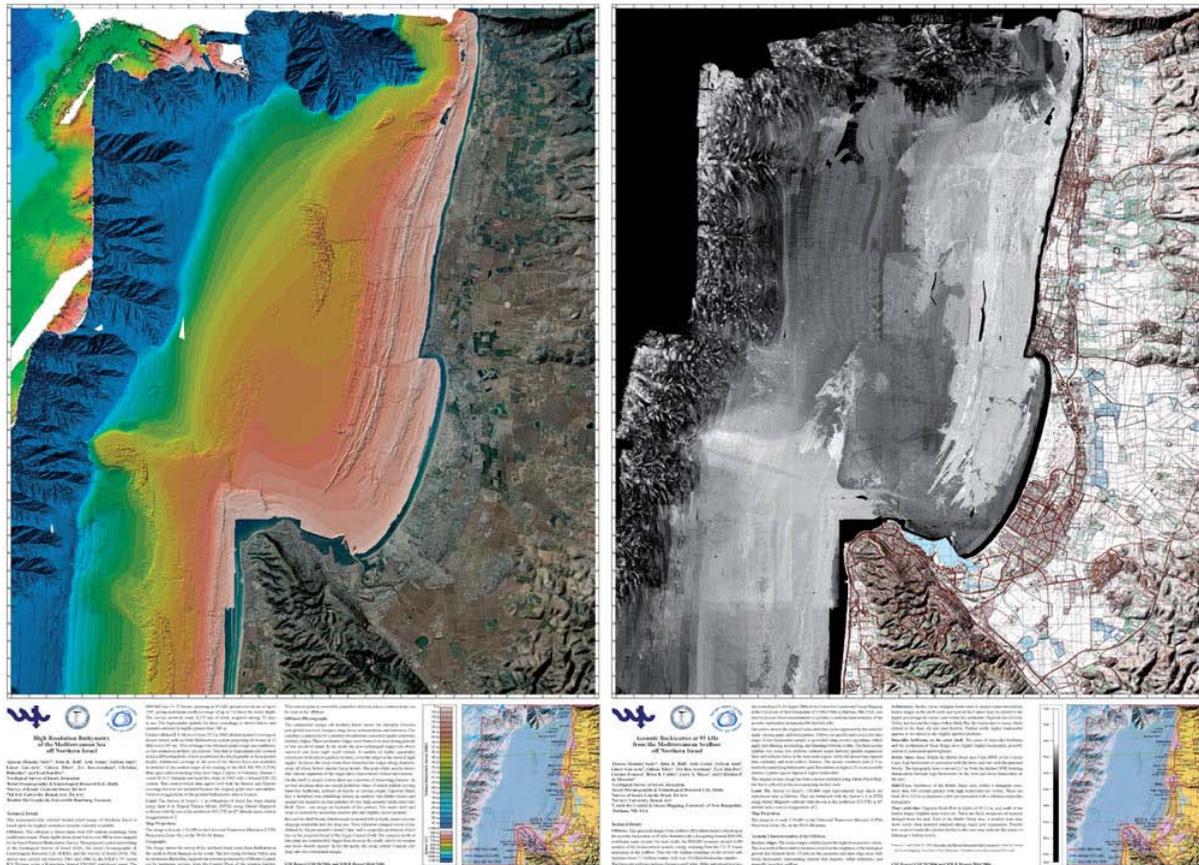
International Outreach

Israel already has one graduate, Hadar Sade, of the Nippon GEBSCO program in Ocean Mapping at the University of New Hampshire's Center for Coastal and Ocean Mapping (CCOM). A second student, Tomer Ketter, is a member of the 2013-14 class, the program's tenth. It is hoped that they, together with Hadar's brother Ronnie who did the bulk of the NBS work, will become the future backbone of hydrography in Israel, as the country develops its EEZ.

The University of Haifa is also one of the few sites with an Exploration Command Center (ECC) for active participation in the Institute for Exploration's cruises of Ballard's vessel E/V Nautilus which spent four seasons (2009-2012) exploring the Mediterranean and Black Seas.



Israel Mediterranean Multibeam Coverage 2001-2011



Multibeam bathymetry for Northern Israel (Western Galilee)