MARINE INVESTIGATION

Marine Resistivity Survey on the Lagoon of Venice, Italy

CASE HISTORY

Objective: To demonstrate the SuperSting™ Marine System's capability in investigating marine environments and producing data for inverted resistivity cross sections.

Survey site: Venice, Italy

Instruments Used: An 8-channel SuperSting™ Marine System, and a streamer cable with 11 electrodes spaced at 3 meter intervals, a fathomer, and a GPS. This survey used a moving Dipole-Dipole array.

Software Used: EarthImager 2D™

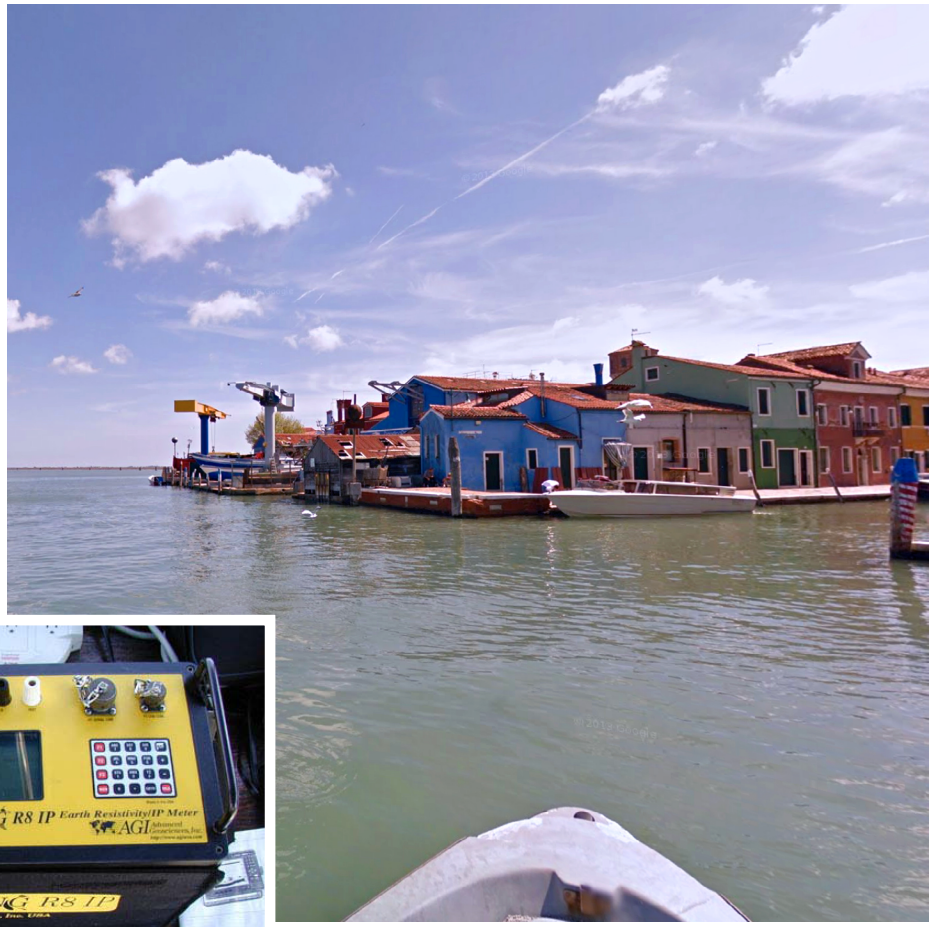
BACKGROUND:

During a week in May, 2003—the DelTech International Workshop was held in Venice, Italy. The workshop hosted several seminars, equipment demonstrations, and a trip into the field—which in the case of Venice—was predominantly marine-based.

As part of the equipment demonstrations, Advanced Geosciences, Inc. (AGI) participated with it's SuperSting™ Marine towed resistivity imaging system.

A preparation survey was performed beforehand and a final survey, which is the subject of this case history, was performed afterward. This report only treats resistivity data collected along lines 1 – 3 (see Figure 2 on the next page).

(Process continued on page 2)



Pictured to the left is the SuperSting R8 Marine System. This 8-channel system was used to collect data on the Venice Lagoon.

MARINE INVESTIGATION

Marine Resistivity Survey on the Lagoon of Venice, Italy

AGI Advanced Geosciences, Inc

CASE HISTORY

PROCESS:

The survey was undertaken using the AGI SuperSting™ R8 Marine system and a streamer with 11 electrodes at 3 meter intervals. The SuperSting™ instrument had 8 receivers and a transmitter, making it possible to record eight readings simultaneously as the current was injected through the two current electrodes.

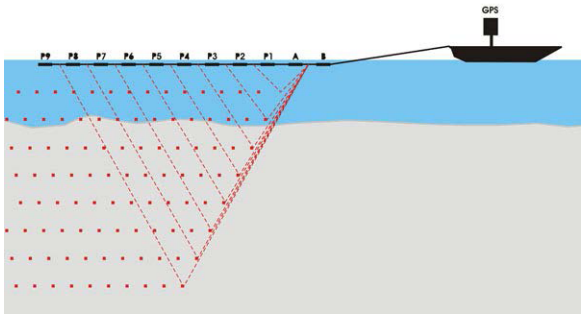


Figure 1 - Current is injected into the water every 3 seconds and 8 potential differences is measured simultaneously as the boat moves forward.

The streamer was towed at the surface of the water in such a way that the electrodes were totally submerged below the surface at all times. The two electrodes nearest to the boat were used for current injection and the other nine electrodes were used for potential measurements. An electric current was injected into the water approximately every 3 seconds through the two current electrodes. The resulting eight potential differences, between the following 9 electrodes, were simultaneously measured and recorded. The survey array could be considered a moving Dipole-Dipole electrode array. Typically with this array, the method will see 25% of the electrode spread length, into the water and bottom. Using 11 electrodes at 3 meter spacing gives a maximum electrode spread length of 30 meters. The expected depth of investigation, with this electrode arrangement, was therefore 7.5 meter from the surface and down.

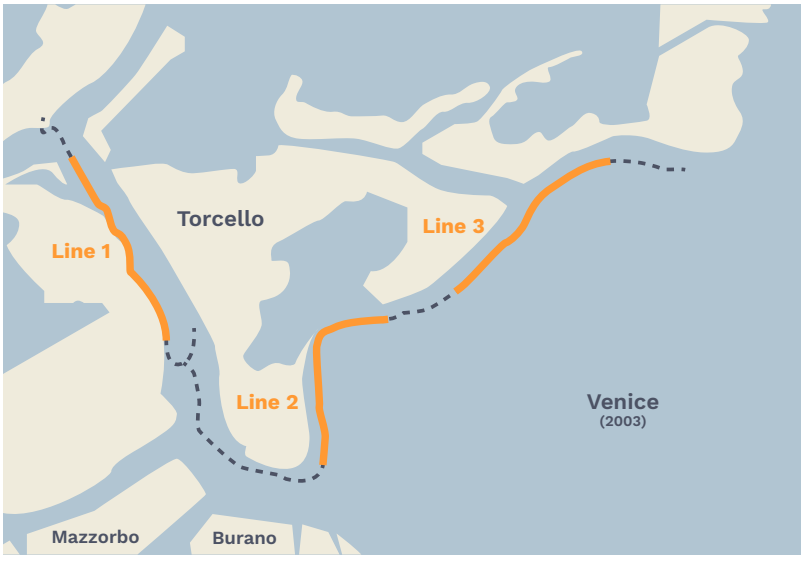


Figure 2 - The dashed lines were the GPS track of the boat. Resistivity data was collected along orange lines 1-3.

A GPS receiver was placed on the boat and the SuperSting™ was time synchronized with the GPS, making it possible to calculate the location of each electrode, assuming that the electrode cable trailed the boat track.

A 200Khz depth sounder was time synchronized with the GPS and used for entering a priori information about water depth during the inversion modeling.

The boat was moving forward at about 3 knots (3.4 mph or 5.4 kph) with a measurement performed approximately every 3 seconds for a duration of 800 ms. This resulted in a new reading every 2 meters of travel to over sample the subsurface allowing for some data removal due to periodic noise or waves. This speed along with the electrode spacing of 3m meters resulted in a nominal 2.5 meter resolution of the sub bottom sediment.

MARINE INVESTIGATION

Marine Resistivity Survey on the Lagoon of Venice, Italy

CASE HISTORY

RESULTS:

This marine investigation produced inverted resistivity cross sections for the 3 survey lines. Several interesting observations were made:

- The inverted resistivity cross sections show surprisingly good resolution considering the conductive sea water environment.
- Based on Archie's law and the assumption of consistent porewater salinity, the resistivity anomalies encountered in the Venice Lagoon survey roughly reflect porosity variations (high resistivity = less porosity) in the bottom sediments.
- All sections show that evidence of resistivity gradient agree with the 200Khz depth sounder depth.
- Continuous resistivity profiling have shown effective in rapidly imaging large areas.
- Continuous resistivity profiling is a proven tool for the study of fresh and salt water interactions along shorelines where groundwater discharge is expected.

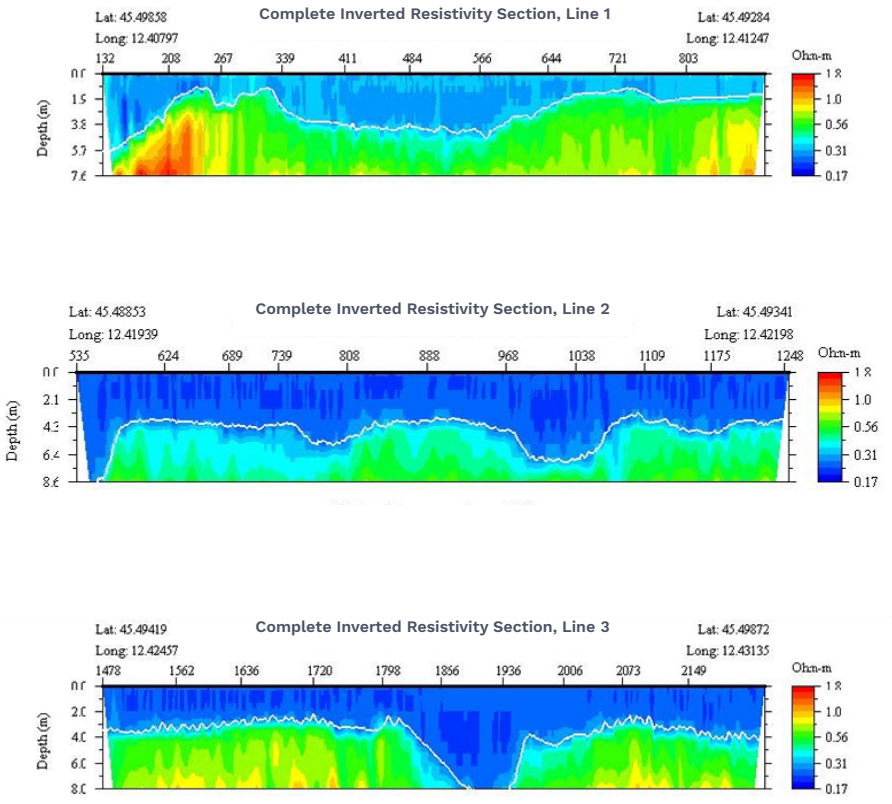


Figure 3 - The inverted resistivity cross sections of lines 1-3. A white line indicates the bottom as measured with the 200Khz depth sounder.

CONTACT US TO LEARN MORE:
Email: sales2@agiusa.com | **Phone:** +1.512.335.3338 | **Website:** www.agiusa.com