International Association of Oil & Gas Producers

City Tower
40 Basinghall Street
14th Floor
London EC2V 5DE
United Kingdom

T +44 (0)20 3763 9700
F +44 (0)20 3763 9701
reception@iogp.org
www.iogp.org

FOR IMMEDIATE RELEASE

Press release

Contact

Lucyna Kryla-Straszewska
Principal Manager - Digital and Geomatics
lks@iogp.org

IOGP publishes industry guidelines for Seawater pressure to depth conversions

(London) Vertical positioning is a persistent challenge in the offshore oil and gas industry. The accurate determination of vertical distance through seawater is a complex task involving multiple dynamic variables. This recent Geomatics Committee publication aims to provide a voluntary standardized approach for the determination of depth or height from seawater pressure observations, a subject for which there is currently no industry-wide technical specification.

FORMULAS, PRACTICAL GUIDANCE, AND DATA STANDARDS

The hydrostatic equation along with various equations for the estimation of gravitation potential and gravitational acceleration are explored in detail and presented in a standardized formula notation designed to be consistent with this report's principal references on oceanography and physical geodesy.

On a more practical level, guidance is given for the acquisition, processing, and reporting of metocean data, with detailed discussion on depth conversion accuracies, error sources, and pitfalls to avoid.

Definitions and units of measure are presented for seawater pressure, temperature, and conductivity that meet current standards for oceanographic data capture and archival, and that are consistent with the standards used by most CTD profilers currently on the market.

TEOS-10

Many oil and gas operators and contractors continue to model metocean data in the legacy International Equation of State of Seawater 1980 (EOS-80). That standard has been superseded by the International Thermodynamic Equations of Seawater 2010 (TEOS-10). This report presents a summary of these two models and their key differences. Instructions are provided on the use of specific functions within the

Gibbs-SeaWater (GSW) Oceanographic Toolbox for seawater height determination under the TEOS-10 system. The GSW Oceanographic Toolbox is a publicly-available suite of functions published in multiple programming languages and is maintained by the Intergovernmental Oceanographic Commission (IOC).

CONVERSION CATALOG

Probably the most useful aspect of this publication will be the two catalogs found in the appendices.

- The “Conversion” catalog for the complete transformation of seawater pressure into a height or depth includes some of the most common conversions known to be in use by the oil and gas industry. Test values are provided to ensure consistency in the implementation of these functions, and the adoption of numerical conversion identifiers should greatly simplify the referencing of these equations across software systems and within project documentation.

- A separate “Method” catalog is included for referencing the subordinate functions for Ocean Model, Geopotential, and Gravitational Acceleration. As with the main Conversion catalog, this catalog is hoped to ease the burden of referencing equations in project documentation, with each method listed by its own alpha-numeric identifier. It also allows users to construct their own custom height/depth conversions through the unique combination of these step-wise method functions.

This work was a joint effort completed by an Expert Group formed under the IOGP Geomatics Committee, and with the much appreciated support and assistance of the Metocean Committee and the Surveying & Positioning Subcommittee.

The report may be downloaded from the IOGP Publications library: https://www.iogp.org/bookstore/product/seawater-pressure-to-depth-conversions.

For more information about the IOGP Geomatics Committee work please visit: https://www.iogp.org/workstreams/engineering/geomatics.

About IOGP

The International Association of Oil & Gas Producers (IOGP) is the voice of the global upstream industry. Oil and gas continue to provide a significant proportion of the world’s energy to meet growing demands for heat, light and transport.

Our Members produce 40% of the world’s oil and gas. They operate in all producing regions: The Americas, Africa, Europe, the Middle East, the Caspian, Asia and Australia.

We serve industry regulators as a global partner for improving safety, environmental and social performance. We also act as a uniquely upstream forum in which our members identify and share knowledge and good practices to achieve improvements in health, safety, the environment, security and social responsibility.