

Supplementary data spreadsheet description

The spreadsheet contains data from 120 petroleum industry wells used for gas hydrate analysis in the North Carnarvon Basin.

Column A: UWI

UWI stands for Unique Well Identifier. Each well in the North Carnarvon Basin has a unique identifier associated with it.

Column B and C: Latitude and Longitude (Surface location)

These two columns show the location of the top of each well. Usually, there are multiple wells that deviate off from a single well in the North Carnarvon Basin, but we have evaluated only the wells with a unique surface location.

Column D: Well Name

This column shows the well name corresponding to each well.

Column E: Gas Mix

This column shows if there is any gas chromatograph data in the well reports. We show the concentration of gases present in a well. C1: Methane, C2: Ethane, C3: Propane, nC4: n-Butane, iC4: iso-Butane

Column F: Deeper Hydrocarbon Reservoir

This column lists either "Yes" or "No". "Yes" means that the gas hydrate stability zone interval in each well is lying vertically above a hydrocarbon reservoir and "No" means that the interval does not lie above a hydrocarbon reservoir.

Column G: Water Depth (mbsl)

Water depth is the vertical depth from mean sea level to the seafloor at a well location. In our dataset, we have listed all the water depths in meters below sea level (mbsl). The minimum water depth is 556.7 mbsl and the maximum water depth is 2007.1 mbsl.

Column H: Seafloor Temperature (C)

Seafloor temperature as described in Section 2 Data and Methods.

Column I: Geothermal Gradient (C/km)

The geothermal gradient is calculated using formation pressure tests in a well. If no formation pressure test is available, we use the bottom hole temperatures to calculate the geothermal gradient. For the wells where no in hole temperature data is available, we use the weighted average geothermal gradient from other wells within a radius of 70 km.

Column J: BHSZ (mbsf)

BHSZ stands for the base of hydrate stability zone and the units are meters below sea floor. We compute the BHSZ using the water depth (Column G), seafloor temperature (Column H) and geothermal gradient (Column I) using CSMHyd software (Sloan & Koh, 2007).

Column K: Drill Floor Elevation from mean sea level (m)

Offshore petroleum industry well logs are measured from the drill floor or rotary table (RT) on the drilling vessel. The RT is usually 10 to 30 meters above the mean sea level.

Column L: HSZ (mTVDRT)

HSZ stands for hydrate stability zone and the units are measured in meters true vertical depth below rotary table (mTVDRT). Because well logs are measured from the drill floor, it is convenient to list the range of HSZ depth from seafloor to BHSZ in mTVDRT.

Column M: Well Deviation

The petroleum industry wells can be vertical or deviated. If a well deviating below the BHSZ, we label it as 'vertical in HSZ' and if the well is deviated within the HSZ, we note the maximum deviation angle that it reaches within the HSZ.

Column N: Available Logs in HSZ

This column shows the available well logs within the HSZ. In general, gamma ray and resistivity logs are available but sometimes bulk density and compressional velocity logs are also available within the HSZ.

Column O: Background Resistivity

We either calculate or estimate the background resistivity for the wells. If a bulk density log is available within the HSZ, we calculate density porosity and use it to calculate the background resistivity. When a bulk density log is not available, we estimate the background resistivity from the available resistivity log (usually P40H) by identifying the intervals that are water saturated.

Column P: Gas Hydrate Category

We describe the category of hydrate in a well using criteria from Majumdar et al., (2017) and also shown in Table 1 in the manuscript. In our dataset, there are 2 B Category wells, 17 C Category wells and 33 D Category wells.

Column Q: Gas Hydrate Intervals

This column lists the gas hydrate intervals in the wells. If there is no gas hydrate in a well, we mark "N/A".

North Carnarvon Basin hydrate stability zone thickness map

In this section, we present the thickness map for hydrate stability zone thickness across the North Carnarvon Basin. We have also shared a .tiff, .tfw, .xml file that are the components of a raster map. The .tiff file can be imported into any GIS software. Clicking on any part of the thickness map after importing into the GIS software will show the corresponding HSZ thickness for that location within the North Carnarvon Basin.

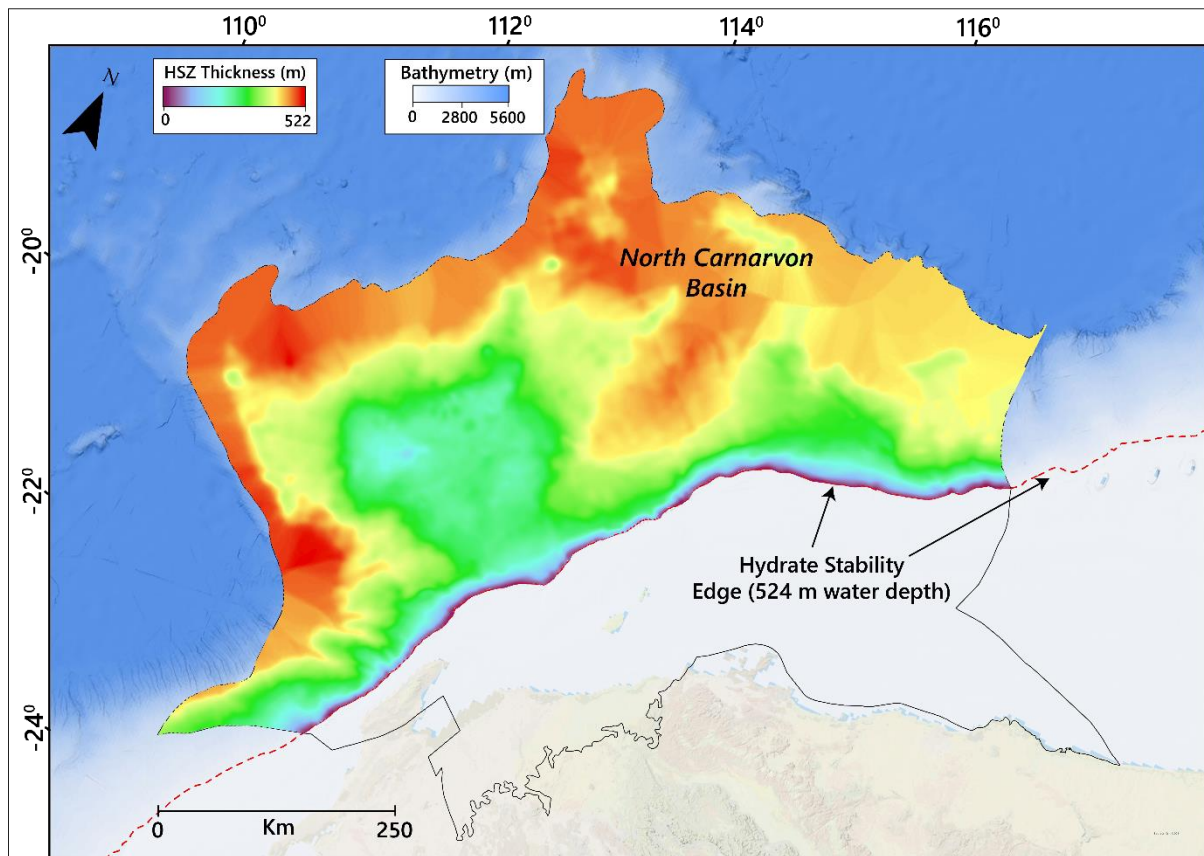


Figure S2. HSZ thickness map across the North Carnarvon Basin