

GCCC Onshore Texas-Louisiana fetch/trap mapping

The accompanying maps show structural closures and their associated fetch areas (drainage cells) for SE Texas and SW Louisiana. The polygons have been mapped by hand in ArcGIS based on the commercially available Geomap "B-series" interpreted geologic surfaces. The B-series is GeoMap's deeper mapped horizon and it was chosen here because it is generally located at depths of 7000-10000ft, in the lower section of the CO2 storage window, where injection is likely to be targeted.

In detail, GeoMap has interpreted their surfaces by hand contouring biostratigraphically-defined horizons in thousands of wells. As a result, the maps are A) best controlled on the highs where there is dense well data, and B) cut by periodic quasi-East-West oriented datum changes where one marker fossil runs out and another is picked up. Spot checks against 2D seismic lines where those were available suggests that the mapped shape is generally correct but that synclines are often interpreted to be shallower than they actually are. It is worth emphasizing that the maps are interpretations and that further interpretation is required to map closures and fetch areas on them. Datum changes, state-line inconsistencies and faults all require interpretation to map closures and fetch areas. Additionally, the 100ft contour interval limits the resolution available.

The following rules were developed to govern interpretation of fetch areas and closures:

- The GeoMap interpretations were taken at face value. Keen observers will note that some areas on the maps are more plausible than others but without better data, any modification is guessing. In the absence of that, the maps were assumed to be correct.
- Any fault with greater than 100ft of throw is considered to be a valid trap edge and thus a candidate to bound a closure. Sand thicknesses are typically 30-60ft in local wells, so 100ft is enough to completely offset most sands. Actual seal properties will need prospect-specific evaluation.
- All CO2 migration is assumed to go straight up the steepest available dip. Stratigraphic variation is unconstrained and therefore not considered.
- All faults are assumed to divert migration as they are likely to present a permeability contrast. Thus, upon encountering a fault, CO2 is assumed to flow laterally until it is trapped or spills around the end of the fault. This shows up as map-view dog-legs in some fetch cells.
- The closures mapped are based purely on geometry with no limit on top-seal capacity. That will need to be evaluated on a prospect-specific basis

Fetch areas are thus bounded by faults, ridges and synclines while closures are defined by faults and spill points, similar to petroleum systems modelling of hydrocarbon migration and accumulation. Details will change on better data but the maps should be good for focusing attention on promising areas. We recommend overlaying them with other datasets, including wells, fields, surface land use, surface character, landward limits of marine shale, etc.

The layers are exported as shapefiles in the NAD_1983_2011_StatePlane_Louisiana_South_FIPS_1702 coordinate system. Details as follows:

WKID: 6478 Authority: EPSG

Projection: Lambert_Conformal_Conic

False_Easting: 1000000.0
False_Northing: 0.0
Central_Meridian: -91.33333333333333
Standard_Parallel_1: 29.3
Standard_Parallel_2: 30.7
Latitude_Of_Origin: 28.5
Linear Unit: Meter (1.0)

Geographic Coordinate System: GCS_NAD_1983_2011
Angular Unit: Degree (0.0174532925199433)
Prime Meridian: Greenwich (0.0)
Datum: D_NAD_1983_2011
Spheroid: GRS_1980
Semimajor Axis: 6378137.0
Semiminor Axis: 6356752.314140356
Inverse Flattening: 298.257222101

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