INCORPORATE PETROGRAPHY INTO PETROPHYSICAL DATABASE

Gregor P. Eberli, Ralf J. Weger, and others.

GOALS OF PROJECT

- Assemble a petrographic data base in carbonates that includes,
  - Geographic location
  - Formation and age
  - Diagenetic alteration
  - Petrophysical properties (porosity, velocity, permeability and resistivity
  - Pore type and quantitative digital image analysis parameters of the pore structure.

RATIONALE

The CSL has an extensive petrophysical data base that includes velocity, permeability, resistivity, porosity and pores types (also expressed as digital image parameters) of a wide variety of different types of carbonates. These petrophysical properties and pore structures are the combined result of original deposition and diagenetic alterations. The diagenetic aspect has so far not been added to the database. Likewise, formation and age and depositional setting is not captured in the petrophysical data base. We decided to include this information to make the data base a more comprehensive source of information for questions along the line: "What kind of porosity/pore types can I expect in Eocene carbonates?".

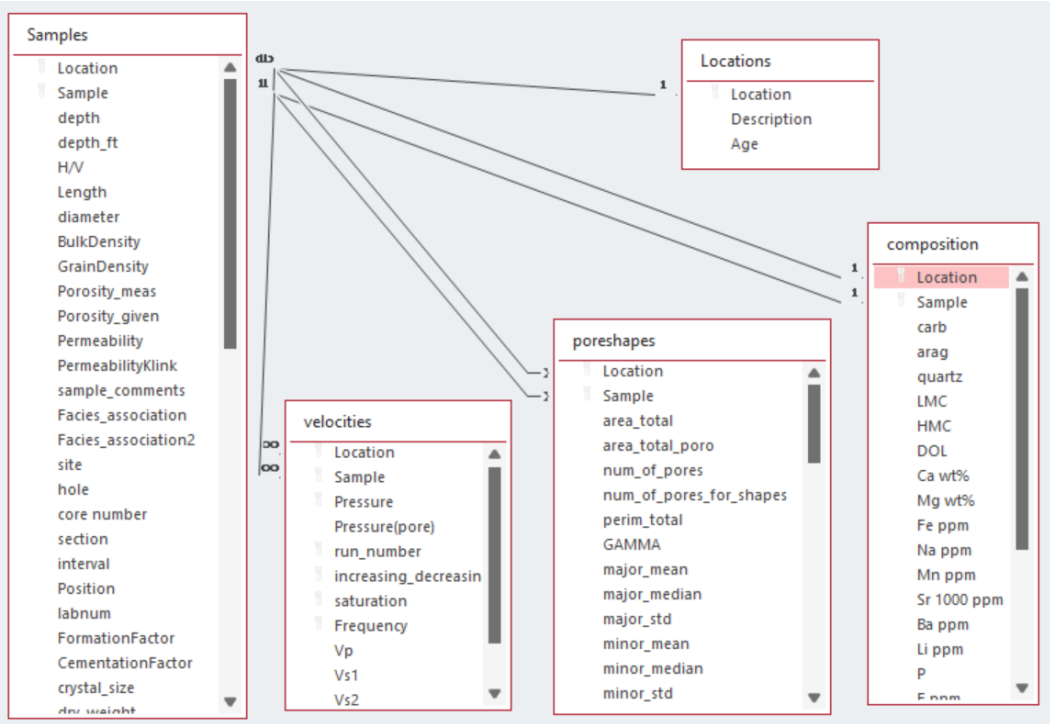

Figure 1: Organization of the CSL Carbonate Data Base.

APPROACH AND TASKS

We will add features to the existing database (Figure 1) that will increase the applicability for general comparison. These additions include:

1. Geographic location and formation name
2. Formation name and age
3. Depositional setting
4. Diagenetic alterations

The geographic location will help to place the sample in a geographical framework. The formation name and age will place it in a stratigraphic context. Determining the precise age will rely on the precision of the dated interval in outcrop or in a core. Likewise, the precise determination of the depositional setting will be dependent on the geologic information provided by the scientist who provided the sample to the database. The biggest task is to capture the diagenetic alteration in a consistent and concise manner so that it can be retrievable in the database. We plan to use some of the parameters that Tonietto (2014) and Tonietto et al. (2014) used for determining the diagenetic coefficient. These include a cement type, cementation intensity and dissolution intensity (Fig. 2)

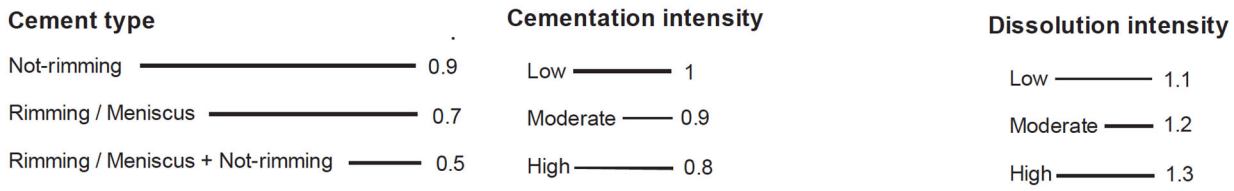

Figure 2: Determination of cement type, cementation and dissolution intensity from Tonietto et al (2014)

SIGNIFICANCE

This combined petrographic and petrophysical database will be of great value to as a comparison database for coeval deposits worldwide. It can be interrogated both from the geophysical side as well as from a geological side and as such should be a versatile tool for estimating geological and petrophysical properties of little-known strata in a frontier region.

REFERENCES

Tonietto, S. N., 2014, Pore characterization and classification in carbonate reservoirs and the influence of diagenesis on the pore system. Case study: thrombolite and grainstone units of the upper Jurassic Smackover Formation, Gulf of Mexico. Ph.D dissertation, Texas A&M, pp 518.

Tonietto, S. N., Smoot, M. Z., & Pope, M., 2014, PS Pore Type Characterization and Classification in Carbonate Reservoirs. Search and Discovery Article #41432