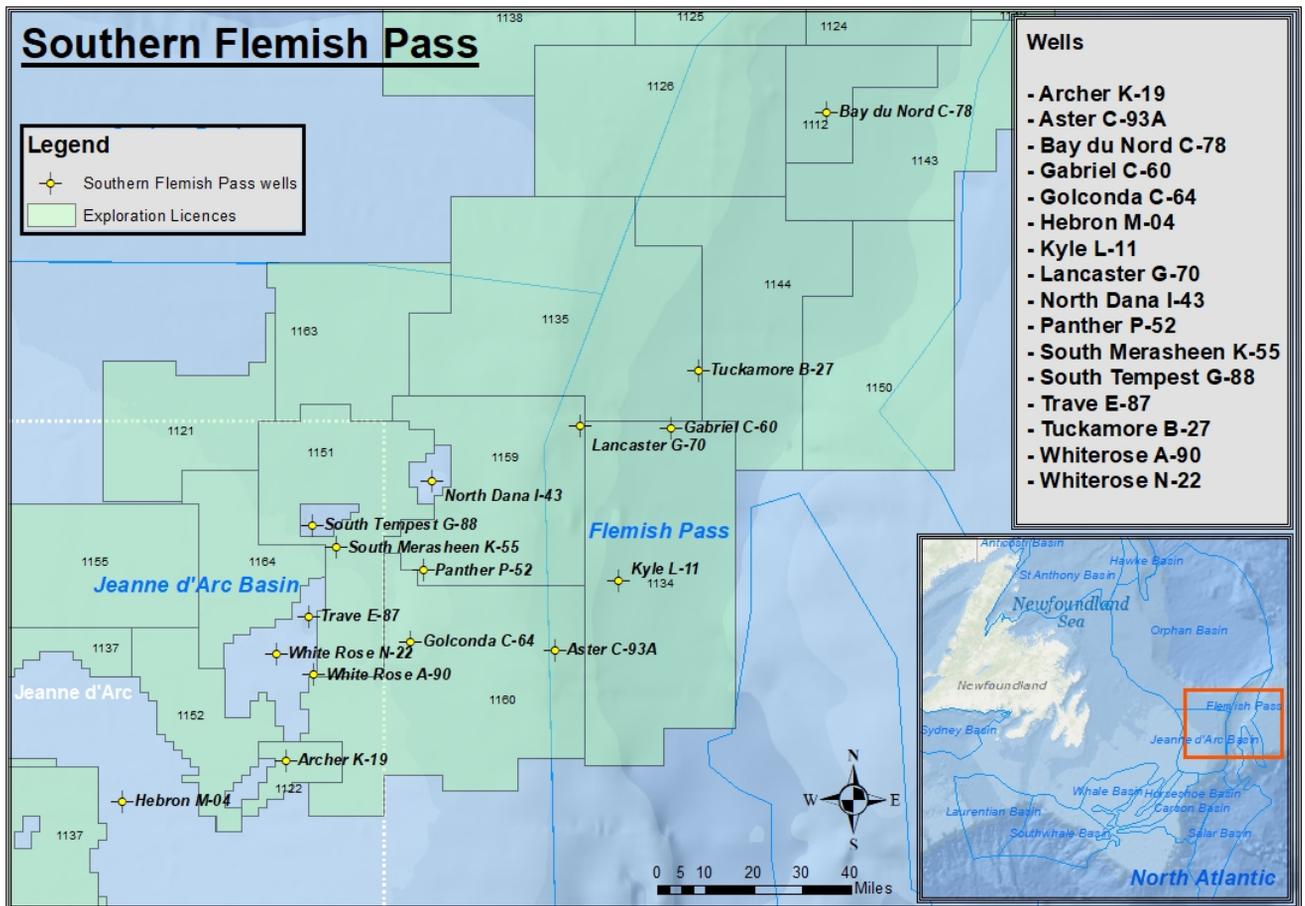


Integrated stratigraphic framework for southern Flemish Pass Basin, offshore Newfoundland

The southern part of the Flemish Pass Basin lies between the productive Jeanne d'Arc Basin (Whiterose, Hebron, Terra Nova and Hibernia Fields) and the soon-to-be-developed northern Flemish Pass (Bay du Nord). This frontier area has attracted major investment in exploration licences. There is an industry need to maximise information gleaned from limited well penetrations and resolve ambiguities (released interpretations vary widely). A refined and robust integrated stratigraphic and provenance model as developed herein will assist play fairway mapping.



Future Geoscience provides a unique, fully integrated stratigraphic solution that will assist correlation between continental/marginal marine and fully marine facies based on integration of quantitative biostratigraphy, chemostratigraphy, mineralogy, zircon ages and heavy mineral provenance combined with E-log data.

This multi-disciplinary stratigraphic study focuses on 16 wells (see list above). The wells selected are primarily located in the southern Flemish Pass and adjacent eastern Jeanne d'Arc Basin, including 2 key Whiterose wells. Inclusion of Hebron M-04 provides ties to the central Jeanne d'Arc Basin. The addition of Bay du Nord C-78 to the north provides a link across the unexplored central Flemish Pass.

This study builds upon previous Biostratigraphy and Chemostratigraphy/Provenance studies by Future Geoscience partners PetroStrat and Chemostrat, respectively, by fully integrating all data, adding more wells and sample data, and upgrading interpretations based on new and recently released data. Licensees of earlier overlapping studies will receive a proportional discount in recognition of data already licensed.

Integrated Stratigraphic framework for southern Flemish Pass Basin

Background

This study builds on the substantial eastern Canada experience base of Future Geoscience JV partners Chemostrat Ltd and PetroStrat Ltd, industry leaders in chemostratigraphy and biostratigraphy, respectively. Data are comparable with recent non-exclusive studies by Future Geoscience (Carson Basin), PetroStrat (Orphan Basin and greater Flemish Pass) and Chemostrat (several eastern Canada studies also covering the Jeanne d'Arc Basin).

Methodology

The multidisciplinary workflow includes a thorough review of released data and substantial program of new analyses including quantitative micropalaeontology, nannopalaeontology & palynology. ICP, XRD and QEM-SCAN mineral analysis enable significant refinement of the stratigraphic framework. High resolution forensic provenance investigations, using zircon U-Pb dating and heavy mineral analysis allow assessment of changes in sediment provenance and depositional facies, water depth and source rock potential. This study also affords an opportunity to re-evaluate long-standing lithostratigraphy schemes developed in the Jeanne d'Arc Basin.

Biostratigraphy - Following a review of released data and "gap analysis" many new analyses were run to verify, test, and improve interpretations. The new analyses were biased towards nannopalaeontology (historically under-utilised in eastern Canada) with micropalaeontology and palynology analyses targeted following the initial data review. Analyses typically commenced within the lower Cenozoic, however, any pre-existing data from the overlying section were also reviewed and reinterpreted. When integrated with chemical data (below) this enabled consistent and accurate age-dating (applying GTS 2016), identification of sequence boundaries, quantification of the magnitude of unconformities (allowing confident calibration of seismic), and characterization of depositional environments (which should assist understanding of source, seal, and reservoir distribution).

Chemostratigraphy – ICP analyses typically commenced within the lower Cenozoic and extended down to TD, providing an independent stratigraphic framework and mineralogy dataset.

Provenance - The new stratigraphic framework established herein has been used to constrain forensic provenance investigations, using detrital zircon U-Pb dating and Raman heavy mineral analysis. Zircon grains extracted from the heavy mineral samples were analysed by laser ablation inductively-coupled plasma mass spectrometry (LA-ICP-MS). New high resolution QEM-SCAN data will also provide additional mineralogical and textural provenance data on quartz, feldspars, lithics and other detrital components.

Deliverables

Integrated summary logs and correlation panels will incorporate chronostratigraphy, lithostratigraphy, biozones, bioevents, chemosequences and subsequences, provenance and mineralogy assemblages and candidate sequence stratigraphic surfaces (identified via integration of biostratigraphic and log criteria), all calibrated to GTS 2016. Summary logs also display significant previous (released) age interpretations for comparison.

The accompanying report text will discuss degrees of interpretational certainty/uncertainty, explain major revisions relative to earlier interpretations, outline the palaeoenvironmental history of each well location, and describe the chemosequences, provenance signals and controls on reservoir quality. All new data are presented graphically and available digitally, as below.

Delivery Format: The report is in digital pdf format. Data will be delivered in digital Spotfire, StrataBugs, WellCAD and/or IC format, as required.

Completion: Q1 2021

Terms

This study is available via data licensing agreement to E&P companies on a single or group basis (applicable to *bona fide* licence groups).

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