<<   >>

<<   >>

13   ISBN   9787502170752

10   ISBN   7502170758

           2009-4

            .

      375

                        PDF

2001

28

2002   2   "   "   2006
   4   "   "

                                                                                      6

1. Introduction SEQUENCE STRATIGRAPHY——AN OVERVIEW Sequence Stratigraphy in the Context of Interdisciplinary Research Sequence Stratigraphy——A Revolution in Sedimentary Geology HISTORICAL DEVELOPMENT OF SEQUENCE STRATIGRAPHY Early Developments Sequence Stratigraphy Era——Eustatic vs. Tectonic Controls on Sedimentation Sequence Models SEQUENCE STRATIGRAPHIC APPROACH Terminology Concept of Scale Sequence Stratigraphy vs. Lithostratigraphy and Allostratigraphy 2. Methods of Sequence Stratigraphic Analysis INTRODUCTION FACIES ANALYSIS: OUTCROPS, CORE, AND MODERN ANALOGUES Concepts of Depositional System, Facies, and Facies Models Classification of Depositional Environments Walther's Law Sedimentary Petrography Paleocurrent Directions Pedology Ichnology General Principles Ichnofacies Classification Softground.related Ichnofacies Substrate-controlled Ichnofacies Discussion WELL LOGS Introduction Well Logs: Geological Uncertainties Constraining Well-log Interpretations SEISMIC DATA Introduction Physical Attributes of Seismic Data Workflow of Seismic Data Analysis Reconnaissance Studies Interval Attribute Maps Horizon Attribute Maps 3D Perspective Visualization AGE DETERMINATION TECHNIQUES WORKFLOW OF SEQUENCE STRAT1GRAPHIC ANALYSIS Step 1 Tectonic Setting (Type of Sedimentary Basin) Step 2——Paleodepositional Environments Step 3——Sequence Stratigraphic Framework Stratal Terminations Stratigraphic Surfaces Systems Tracts and Sequences 3. Accommodation and Shoreline Shifts INTRODUCTION ALLOGENIC CQNTROLS ON SEDIMENTATION Significance of Allogenic Controls Signatures of Allogenic Controls Relative Importance of Allogenic Controls SEDIMENT SUPPLY AND ENERGY FLUX Sediment Supply Sediment Supply vs. Environmental Energy Flux SEDIMENT ACCOMMODATION Definitions——Accommodatipn, Base Level, and Fluvial Graded Profiles Proxies for Base Level and Accommodation ……4. Stratigraphic Surfaces 5. Systems Tracts6. Sequence Models7. Time Attributes of Stratigraphic8. Hierarchy of Sequences and9. Discussion and Conclusions

method for analyzing seismic-reflection data stimu-lated a revolution in stratigraphy, with an impact onthe geological community as important as the intro-duction of the flow regime concept in the late 1950s——early 1960s and the plate tectonics theory in the 1960s Miall, 1995 . The concepts of seismic stratigraphywere published together with a global sea-level cyclechart Vail et al., 1977 , based on the underlyingassumption that eustasy is the main driving forcebehind sequence formation at all levels of stratigraphiccyclicity. Seismic stratigraphy and the global cyclechart were thus introduced to the geological commu-nity as a seemingly inseparable package of new strati-graphic methodology. These ideas were then passed onto sequence stratigraphy in its early years, as seismicstratigraphy evolved into sequence stratigraphy withthe incorporation of outcrop and well data Posamentier et al., 1988; Posamentier and Vail, 1988;Van Wagoner et al., 1990 . Subsequent publhcations e.g., Hunt and Tucker, 1992; Posamentier and James,1993; Posamentier and Allen, 1999 shift the focusaway from eustasy and towards a blend of eustasy andtectonics, termed relative sea level. Nonetheless, theglobal-eustasy model as initially proposed Vail et al.,1977 posed two challenges to the practitioners ofconventional stratigraphy: that sequence stratigraphy,as linked to the global cycle chart, constitutes a superiorstandard of geological time to that assembled fromconventional chronostratigraphic evidence, and thatstratigraphic processes are dominated by the effects ofeustasy to the exclusion of other allogenic mechanisms,including tectonisrn Miall and Miall, 2001 . Althoughthe global cycle chart is now under intense scrutiny andcriticism e.g., Miall, 1992 , the global-eustasy model isstill used for sequence stratigraphic analysis in somerecent publications e.g., de Graciansky et al., 1998 . In parallel to the eustasy-driven sequence stratigra-phy which held by far the largest share of the market,other researchers went to the opposite end of the spec-trum by suggesting a methodology that favored tecton-ism as the main driver of stratigraphic cyclicity. Thisversion of sequence stratigraphy was introduced astectonostratigraphy e.g., Winter, 1984 . The majorweakness of both schools of thought is that a prioriinterpretation of the main allogenic control on accom-modation was automatically attached to any sequencedelineation, which gave the impression that sequencestratigraphy is more of an interpretation artifact thanan empirical, data-based method. This a priori interpre-tation facet of sequence stratigraphy attracted consider-able criticism and placed an unwanted shade on amethod that otherwise represents a truly importantadvance in the science of sedimentary geology. Fixing thedamaged image of sequence stratigraphy onlyrequires the basic understanding that base-levelchanges can be controlled by any combination ofeustatic and tectonic forces, and that the dominance ofany of these allogenic mechanisms should be assessedon a case by case basis. It became dear that sequencestratigraphy needed to be dissociated from the global-eustasy model, and that a more objective analysisshould be based on empirical evidence that can actu-ally be observed in outcrop or the subsurface. Thisrealization came from the Exxon research group, wherethe global cycle chart originated in the first place:Each stratal unit is defined and identified only byphysical relationships of the strata, including lateralcontinuity and geometry of the surfaces bounding theunits, vertical stacking patterns, and lateral geometryof the strata within the units. Thickness, time for forma-tion, and interpretation of regional or global origin arenot used to define stratal units..., [which]... can beidentified in well logs, cores, or outcrops and usedto construct a stratigraphic framework regardless oftheir interpreted relationship to changes in eustasy Van Wagoner et al., 1990 . The switch in emphasis from sea-level changes torelative sea-level changes in the early 1990s e.g., Huntand Tucker, 1992; Christie-Blick and Driscoll, 1995 marked a major and positive turnaround in sequencestratigraphy. By doing so, no interpretation of specificeustatic or tectonic fluctuations was forced uponsequences, systems tracts, or stratigraphic surfaces.Instead, the key surfaces, and implicitly the stratal unitsbetween them, are inferred to have formed in relationto a more neutral curve of relative sea-level base-level changes that can accommodate any balancebetween the allogenic controls on accommodation.

PDF

:http://www.tushu007.com