Member are characterized by lateral accretion elements, erosion surfaces and a high degree of amalgamation resulting in high aspect ratio sand bodies up to 800 m wide and 13 m thick. Channel fills in the Sunburst Member are up to 27 m thick, characterized by abundant lateral accretion elements, and show a moderate degree of amalgamation. Channel fills in the Red Sandstone member are up to 41 m thick; lateral accretion elements are present and these channel fills are isolated in a higher proportion of fine-grained overbank sediments in comparison to underlying units. Paleohydrographic estimates from measured point bar thicknesses show that the drainage basins likely increased in size throughout deposition of these units. Detrital zircon provenance analysis indicates recycling of sedimentary strata from the southwestern United States in the lower two units, and a shift to Cordilleran magmatic arc provenance for the Red Sandstone Member.

Increased rates of tectonic subsidence through evolution of the foreland basin is supported by: (1) stacking patterns of strata from highly amalgamated to less amalgamated channel fills; and (2) concurrent evidence for increased flux of magmatic arc detritus into the basin. We link Cordilleran orogenic activity to patterns of landscape development and basin filling in the Western Interior.

Effects of biofilm on flow over and through a permeable bed

MFL

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Biofilms constitute an important form of bacterial life in aquatic environments and are present at the interface of fluids and solids, such as riverbeds. Biofilms are permeable, heterogeneous, and deformable structures that can influence the flow and mass/momentum transport, yet their interaction with flow is not fully understood in part due to technical obstacles impeding quantitative experimental investigations. The porosity of river beds results in the generation of a diverse mosaic of `suction' and `ejection' events that are far removed from typical assumptions of turbulent flow structure over an impermeable bed. In this work, the effect of biofilm on bed permeability is studied. Experiments are conducted in a closed water channel equipped with 4-cm-deep permeable bed models consisting of horizontal cylinders normal to the bulk flow direction, forming an idealized two-dimensional permeable bed. Prior to conducting flow experiments, the models are placed within an independent biofilm reactor to initiate and control the biofilm growth. Once a targeted biofilm growth stage is achieved, the models are transferred to the water channel and subjected to transitional and turbulent flows. Long-distance microscopic particle image velocimetry measurements are performed to quantify the effect of biofilm on the turbulence structure of the free flow as well as the freestream-subsurface flow interaction.

The role of Late Quaternary incised valley systems in coastal-plain aquifer geometry: A case study from the Arno Plain (Ligurian Sea, Italy)

FSSR

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The Late Quaternary subsurface successions buried beneath several delta-coastal plains exhibit distinct cyclic facies patterns that reflect the predominant control exerted by climate-eustatic factors on sedimentation, at Milankovitch and sub-Milankovitch scales. However, local subsidence co-operates with Late Quaternary glacio-eustatic fluctuations in determining changes in accommodation space through time and space. During phases of sea-level rise (interglacial periods), subsidence further increases the accommodation space. On the other hand, during the subsequent phases of sea-level fall (glacial periods) subsidence works to mitigate the accommodation space reduction, resulting in a better preservation of the depositional record.

In the case of rapidly subsiding regions, such as the Po Plain (N Adriatic Sea, Italy), the combined tectonic-eustatic effect led to a vertically stacked succession of transgressive-regressive (T-R) sequences forming a multilayered aquifer system (Amorosi and Colalongo, 2005; Amorosi and Pavesi, 2010). In a hydrostratigraphic view, sheet-like, channel-belt fluvial bodies, tens of m-thick in the regressive portion of the T-R sequences represent major aquifers. In contrast, pronounced fluvial incisions occurred during glacial periods in coastal plains characterized by lower rates of subsidence, as those facing the Ligurian-Tyrrhenian margin (e.g. Arno Plain, Ombrone Plain, Tiber Plain, Volturno Plain). These erosive processes led to the formation of km-wide and tens of m-thick paleovalleys able to erode confined aquifers, reducing their lateral continuity. In these contexts, the reconstruction of the aquifer systems is further complicated by the incised valley fill (IVF) successions formed during the subsequent interglacial periods. These IVFs, which consist predominantly of estuarine muddy deposits, represent, in fact, localized impermeable barrier to ground-water circulation. A high-resolution multiproxy approach (sedimentological, faunal and chronological data) and the application of sequence stratigraphic principles can furnish a successful three-dimensional representation of such complex aquifer systems.

The Arno coastal plain (Ligurian Sea, Italy) represents an ideal setting where to investigate the hydrostratigraphic role of incised valley systems (IVSs), as two well-preserved IVFs have been identified within the uppermost 100 meters and dated to two non-consecutive interglacial cycles (MIS 7 and MIS 1; Amorosi et al., 2008; Rossi et al., in press). Based on a large subsurface stratigraphic dataset, composed of hundreds of > 50 m long cores, ^{14}C and ESR chronological data, and stratigraphic correlation, a representation of the Arno Plain aquifer system is outlined. We focused on the identification and mapping of potential aquitards/aquicludes (IVFs) and aquifers. These latter include: (*i*) laterally discontinuous gravel terrace deposits developed at different stratigraphic levels along the paleovalleys flanks, (*ii*) lenticular channel-belt sand bodies formed during the glacial phases that preceded IVSs formation, and (*iii*) post-valley fill coastal-marine sands showing a landward-wedging geometry.

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Brahmaputra in the fold: Linking Mio-Pliocene exposures of the Indo-Burman fold and thrust belt to the modern Ganges-Brahmaputra-Meghna delta

RDC

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The Indo-Burman Ranges (IBR) of eastern India coevolved with three of the largest active geological features on Earth: the Sunda subduction zone, the Ganges-Brahmaputra-Meghna delta (GBMD), and the long-lasting Himalayan Indo-Asia collision zone. The region presents a unique opportunity to examine time-transgressive coupling of active fluvial and tectonic