ing toward the upper line of tilted blocks has supplied structures which can be interpreted as vents, passive walls and even evacuated allochthonous salt sheets in comparison with analog modelling of salt tectonic driven by progradation. Rim synclines and rollover synclines with high sedimentation rate have evolved during the Jurassic and Lower Cretaceous.

Collision belts of the Verkhoyansk-Chukotka orogenic area (North-East Asia)

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The Verkhoyansk–Chukotka orogenic area consists of Verkhoyansk–Kolyma and Novosibirsk–Chukotka collision orogens (belts) (Zonenshain et al. 1990, Parfenov 1991, Sokolov et al. 1997, Fujita and Newberry 1982). These structures formed as a result of Anyui–Angayucham ocean closing. This ocean separated the Asian and Euro-American cratons in Paleozoic to Mesozoic times. The Verkhoyansk–Kolyma arcuate collisional orogen (Kolyma Loop) originated as a result of Late Jurassic to Early Cretaceous accretion of the Asian craton continental margin with the Kolyma–Omolon composite superterrane (Parfenov 1991). The Novosibirsk–Chukotka orogen formed in the Early Cretaceous by collision of the Novosibirsk–Chukotka microcontinent and Asian craton continental margin (Seslavinskiy 1979, Sokolov et al. 2000).

The outer part of the Verkhoyansk–Kolyma orogen (Verkhoyansk fold-and-thrust belt) consists of Paleozoic to Mesozoic shelf sediments and turbidite of the Asian continental margin. These rocks are deformed by different types of thrust structures with western and north-western vergency (Prokopiev 1998). The central part (Chersky belt) consists of several continental terranes which were rifted from Asian margin in the Late Paleozoic, being made by Paleozoic limestone shelf sediments, and Late Paleozoic to Early Mesozoic terrigenous and terrigenous-siliceous turbidite sequences. These complexes were tectonically overlapped by Paleozoic ophiolite allochthons – fragments of the Anyui–Angayucham ocean. The ophiolites associated with polymetamorphosed schists are characterized by the early ductile deformation and medium-pressure metamorphism connected with oceanic crust tectonic layering, which took place before ophiolite sequence obduction onto the Asian shelf. The back part (Alazeya–Oloy belt) includes compexly deformed Paleozoic to Mesozoic volcaniclastic rocks of island arc origin. This formation marks the complicated and long time existing convergent margin of the Asian and Anyui-Angayucham ocean.

Novosibirsk–Chukotka orogen is bordered from the south by island arc sequences of the Alazeya-Oloy belt. These sequences formed far off north vergent allochthonous slices which tectonically overlay the complexes of the South Anyui ophiolite suture zone. The complexes of the South Anyui suture and sequences of the Alazeya–Oloy belt build the north vergent deformed allochthons. The allochthons consist of dismembered ophiolite sequences of various age, volcaniclastic rocks of Late Mesozoic and Late Jurassic accretionary melange sequences. The autochthon consists of highly deformed Triassic turbidite of the Novosibirsk–Chukotka microcontinent passive margin. The Late Jurassic volcanic sequences probably of island arc origin are located along the allochthon front. These rocks were folded and thrust too. The nappe structures are overlapped with slow-deformed neoautochthon of Hauterivian to Barremian age.

Early deformations in the Verkhoyansk–Kolyma collision orogen (Middle Jurassic) were connected with the Kolyma–Omolon superterrane amalgamation and earliest stage of one and Asian craton collision. This event fixed accretionary thrusts, nappes, and recumbent and overturned folds of north-east vergency. Late collisional (Late Jurassic-Neocomian) structural assemblages characterized by combined kinematics with sinistral transpression component that was connected with oblique collision (Oxman, Prokopiev 1996, Oxman 1998), and counterclockwise rotation of convergent structures (Didenko and Bondarenko 1998, 2000). For the Novosibirsk–Chukotka collision orogen two main stages of the Mesozoic structural evolution were identified. The first stage is connected with Late Jurassic and probably Early Mesozoic convergence processes along the southern margin of the Anyui–Angayucham ocean. There the accretionary melange and duplex structures are formed – good indicators of accretionary wedge forming. The second stage is connected with the Asian craton and Novosibirsk–Chukotka microcontinent collision.

The northerly vergent nappes structure formed during early substage of collisions in Valanginian to Houterivian times. The nappe roots in the modern structure were tectonically overlapped by island arc sequences of the Alazeya–Oloy belt. The orthogonal collision has changed into the oblique collision during the second half of the Early Cretaceous. The dextral transpressional strike-slip faults assemblages formed during this substage.

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Structure of the inner part of the Verkhoaynsk–Kolyma collision orogen (North–East Asia)

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The Verkhoyansk–Kolyma arcuate orogen (Kolyma loop) originated as a result of Mesozoic collision of Verkhoyansk continental margin of the North Asian craton with the accreted structures (terranes) of different age in the east, making up composite Kolyma–Omolon microcontinent (superterrane) (Parfenov 1991). The Verkhoaynsk continental margin is transformed into the Verkhoyansk fold-thrust belt which represents outer part of orogenic structures (Parfenov 1991, Prokopiev 1998). The inner part of the mentioned orogen constitutes the Chersky collision belt (Oxman 1998). Western zone of collision belt is formed of Late Paleozoic-Triassic terrigenous turbidite deposits of Kular–Nera slate belt and Tuoctakh block which was overlapped by synaccretional Jurassic formations of Inyali–Debin and Polousnyi sinclinoria. In the eastern axial zone of collision belt blocks of Paleozoic deposits are notable, which in former times composed the single Omulevka microcontinent, stacked allochthons of ophiolite and different metamorphosed blocks, belts of collision granites and Uyandina–Yasatchnyi volcanic-plutonic belt.

Structure of the Chersky collision belt formed during the process of some deformational stages. Early thrust-folds assemblages are connected with accretion of different structures and formations of composite Kolyma-Omolon microcontinent and its convergence with Verkhoyansk continental margin (Middle Jurassic). The initial accretion stages are manifested in eastern and axial parts of the belt of polymetamorphic slates and ophiolite obductions to the blocks of Paleozoic rocks, with formation of frustrated allochthons. Significant crust thickening and formation of large nappes overlaps induced rock recrystallization in greenschist facies at low pressure to northern and central parts of the belt and at medium pressure in southern regions. In the western part of the belt, at the same time olistostromes, different synsedimentary melanges of thrust kinematics are under formations. Calculated values of shortening, with nappes and thrust dislocations for separate blocks, made of Paleozoic rocks, are 55–65 %, and for the formations of Polousnyi synclinorium and Tuostakh block – 35–45 %. In eastern parts of the belts nappe-thrust front corresponded to emergent thrust front type (classification, Morley 1986), and thrust deformations, developed in western outer part of the belt occurred almost at the same time from fronts, occurred in underwater settings, or buried fronts of thrust. Strictly collisional assemblages and deformation structures of the next stages show combined kinematics. They originated as a result of transpression and oblique collision of Kolyma–Omolon microcontinent and Verkhoyansk continental margin (Oxman and Prokopiev 1996), and the rotation of convergent structures (Didenko and Bondarenko 1998, 2000) (Late Jurassic–Neocomian). Early thrusts, located to the axial part of collision belt are transformed to the faults with combined strike-slip and upthrow kinematics. The synchronous major folds have enechelon arrangement of the axes coinciding with the changing fault orientations. Such folds deform the earlier thrusts, nappes, recumbent folds and ophiolite sheets. In north-western and south-eastern segments of the belt such faults have right and left lateral components respectively. In the central part of the belt syncollisional pull-apart basin was formed, where Uyandina–Yasatchnyi volcanic–sedimentary rocks were accumulated. Compression vectors on oblique collision are oriented at different angles to convergent boundaries which causes the transpression and locally transtension mechanism to operate. This, may explain the combined kine-