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The Urals as a multi-collisional Orogen

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The structure of the Earth's crust of the Urals witnesses for a series of collisions of different types, arc-continent collision one of them. The role and place of the latter in the history of this region is well defined by now for the Middle-Upper Devonian stage of development of the Southern Uralides, but there are still quite a few points for a discussion and further research. Some of these points are as follows.

1. The Uralides were preceded and underlain by Timanides, a Neoproterozoic foldbelt, developed in the basement of the Timan-Pechora region of the East-European platform (Baltica continent) and under the western slope of the Uralides, within the footwall of the Main Uralian fault (MUF). There is more or less general agreement now that the foldbelt was formed as a result of a collision in the Ediacarian time (ca. 550-600 Ma).The reconstructions of the foldbelt usually use the idea of its close space relations with the West-and-Central European Cadomides. Many of these reconstructions draw a Cadomian arc which was flanked by an ocean (Protopacific or other). In this case, the orogeny could be only of an arc-continent type. The alternative is in a suggestion that it was a continent-continent collision. The paleomagnetic data are still too ambiguous, but the azimuthal unconformity between the Timanides and the MUF favour the idea that there was another continent at the other side of the Cadomian- Timanide orogen.

2. The active Tagil arc never collided with the continental margin, though the subduction was likely to be inclined from the continent. The reason for the fact that the Tagil subduction zone ceased to exist before the Emsian time may be in its direct connection with the subduction zone of the Iapetus ocean. The collision stopped during the beginning of the Devonian as a result of the Caledonian orogeny.

3. The Magnitogorsk arc was formed before the end of the Early Devonian, and developed until its collision with the passive continental margin in the Southern Urals in

the Late Devonian. In the Middle Urals the arc incorporated the abandoned body of the former Tagil arc, where two zones developed: the western, Petropavlovsk passive zone with narrow carbonate bauxite-hosting arc shelf, and the eastern, Turinsk zone where calc-alkaline volcano-plutonism was still active until the Late Devonian. This part of the arc, northern end of which is not known, did not collide with the continent.

4. The jamming of the Magnitogorsk subdiction zone have led to its jump to a new place in the eastern zones of the Urals where it existed through the Early Carboniferous and became inactive in the Early Bashkirian. The indicative calc-alkaline complexes of the Valerynovka subduction zone are known only in the Southern and Middle Urals. In the northern areas the zone probably deviated to the East, in conformity with the Late Paleozoic oroclinal bend of Kazakhstan. Two competing options concerning the dip of the zone are suggested. In the case of the western dip, it explains the collision with the Kazakhstanian continent. In the case of the eastern dip, we do not see any compelling proofs of the Early Carboniferous collision within the Southern Urals.

5. In the northern area of the Urals, the collision of the passive continental margin of Baltica with the abandoned arcs started only since the Visean. The accompanying Lower Carboniferous complexes (flysch and HP-LT metamorphics) are comparable with the Devonian accretionary complexes of the Southern Urals, therefore probably the contemporaneous suprasubductional volcanic arc was there behind them, concealed now in the West Siberia.

6. The last, Old Kimmerian fit of orogeny affected the Urals in the Mid-Jurassic, with no evident relation to any island arc.

7. Generally speaking, all of it makes the Uralides a multi-collisional orogen with a diachronous, step-by-step shift of a main collisional event to the North and East.