



## **Aldegonda Glacier dynamics (Spitsbergen)**

Bulat Mavlyudov (1), Arsenji Kudikov (1), and Osama Mustafa (2)

(1) Institute of Geography, Russian Academy of Sciences, Russian Federation (bulatrm@bk.ru), (2) ThINK – Thuringian Institute of Sustainability and Climate Protection, Jena, Germany

Aldegonda Glacier is small mountain-valley glacier on the western coast of gulf Grønfjord, Spitsbergen. The glacier is located in 7 km to SE from settlement Barentsburg. The glacier was investigated last years in connection with IAEA project INT5153. It is known that in 1909 the glacier reach of sea shore as ice cliff forming icebergs. Since this time the glacier has started to retreat. To 1936 the glacier has retreated on about 500 m and was stabilized. Further it is known that in 1980th years the glacier retreated very intensively, and to 1990 the glacier edge has retreated from seacoast approximately on 2 km. We assume that so fast retreating of ice edges is connected with that it previously was surging glacier and at the end of Little Ice Age (LIA) glacier move into the sea. The ridges of the moraines, which have been found out under water at the edge of glacier moraine complex, testify to it. After the surging the glacier has appeared almost motionless that has led to the accelerated of its surface lowering. Retreating velocity of ice edge varied depending on a thickness of ice at glacier tongue and from a spreading relief features. At the beginning of 2000th it was revealed that the Equilibrium Line Altitude (ELA) of Aldegonda Glacier and the next glaciers has risen so highly, that the majority of glaciers of this region have appeared completely in ablation zone. It has led to that glaciers began to decrease from all directions. Since 2006 the ELA on glaciers has sharply fallen approximately to 400-450 m asl that is equivalent to climate cooling in upper mountain zone and in upper parts of glaciers. It was expressed that the climate in the lower zone (on a sea level) has not changed but in mountains it has become colder. The vertical gradient of air temperature change with elevation has thus increased. It has led to that above ELA level snow and ice accumulation on glaciers has begun. On Aldegonda Glacier it was showed only in the upper part of southern edge of the glacier. Thus glacier tongue continues to retreat. In the summer of 2017 at glacier tongue small lake had appear for the first time. If glacier edge retreating will continued with same rates the lake in front of glacier edge will increase in dimensions that will increase velocity of ice edges retreating. Formation of lake at ice edge will lead to that it becomes an original trap for the suspended and drag sediments which are taken down from glacier surface by water streams in summertime. As a result the quantity of the suspended and drag sediments which the Aldegonda River transports in the sea will decrease at least for a quarter.