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The Numerical Evaluation of Low level Formation in Lut valley Region for Two Hot and Cold Seasons

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The Lut valley is an elongated valley oriented north-north west to south-southeast. The valley has the depth of 2000 m, approximate length of 380 km and average width of 27 km. The middle of the valley is located at 29.6 ˚N & 58.21 ˚E descending southward to the Jaz Mourian dry lake through a pass. The convergent topography of the Lut valley with the valley-parallel pressure gradients generated by the large-scale processes and by the presence of cold air over the valley's sloping terrain can create low level jets. The pressure gradient is mainly counteracted by the frictional force. The imbalance between them controls the intensity and persistence of the jet in the valley. Farther south, the jet evolves into a down slope flow resembling a hydraulic jump on the steep slope of the dry lake. A transition of subcritical situation to supercritical faster flow is found at the mountain crest between the Lut valley and dry lake.

In the numerical study the regional MM5 model with the nesting of 4 km and 12 km and Bam station as nest center was used the outputs of Global forecasting Model (GFS) was considered as input for this model leading to achieve an appropriate dynamical analysis of flows in the region for the two hot and cold seasons of the year.

The results of this study shows the existence of summer synoptical systems causes the formation of north-south pressure gradients in the valley which could be led to the blowing of winds with the velocity more than 14 m/s and vulnerable dust and wind storms lasting more than 120 days.

Since the cold air masses will be located in the region in winter, the average speed of low level jets would be decreased. In this time downslope flows has got a key role in creating the night low level jets.