

## **The Avalanche Disaster of Galtür in 1999 - the Rescue Operation, Analyses with Recalculation and Countermeasures**

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On the 23. of February a catastrophic avalanche disaster happened. It took place in the Tyrolean village of Galtür in the Austrian Alps.

Heavy snowstorms from the Northwest brought in three periods enormous snow masses. Heavy Wind and additionally massive drift-snow packages causes a powder snow avalanche with an unknown dimension. The two neighboured so called "Outer Wasserleiter-Avalanche" and "Weisse Riefe-Avalanche" buried 60 persons, 31 people were killed. 6 houses were destroyed and 18 damaged.

A rescue operation started and because of the locked road only helicopters could reach the valley. Over 12.500 people have been evacuated by 46 helicopters also from the US Army.

To analyses the long runout distance and the destructions detailed investigations were done. By field work and helicopter support the avalanchepath were mapped. After the recalculation of the snow masses and avalanche forces simulations with different models were done. The comparison of the more dimensional models (SAMOS 99, SAMOS AT and ELBA) shows that the second starting area in combination with the great snow entrainment played an important role.

Immediately after the disaster the Austrian Federal Service for Torrent and Avalanche Control developed a project including avalanche barriers and snowpack stabilizing structures.

Now the main parts are finished.