Switzerland has been well known as Alps that crosses its landscape. It is the best place for ski lovers because of its geographical characteristics. The perpetual snow, the slope, and vegetation make some regions to be an ideal place for skiing, and hiking adventures. However, they can also be perfect causes for avalanches. Global statistics, as well as those for Switzerland, always shock us by the massive damage from extreme natural events occurred repeatedly in places where avalanche has for centuries been the part of the landscape. It is essential to take natural catastrophes into seriously consideration for safety of countries because it causes not only the financial damage costs but also huge number of human fatalities. The goal of risk maps is to protect people and buildings by emphasizing dangerous areas. Switzerland, as a beautiful country with lots of mountainous regions, has experienced avalanches for years and the imperative measures, therefore, have to be taken such as analyzing the historical data collected from existed disasters, mapping avalanche risk model and executing effective protection for people and their belongings.

**SNOW ADVENTURE AND RISK**

**HISTORICAL EVENTS**

Number of fatalities due to avalanches within 20 years (1995—2015) has increased to 100 in Valais, Switzerland.

**RESULT**

Spatial distribution of the avalanche risk values shows different risk level in Valais, Switzerland. It can be declared that the most dangerous regions have relatively dense distribution even though most of them are in very tiny areas. Considering the process that avalanche happens, it is always triggered in a small area. However, it can bring huge influence along its snow path even with mud slide and rock fall so that a larger area would be buried. Analyzing the result of avalanche risk in Valais, it is easy to identify that avalanche has close relation to elevation. Almost all the low risk areas are in the valley of Alps. High elevation provides more possibilities for avalanche events. Thus, it is reasonable to determine that the number of fatalities due to avalanches happened in Valais always keeps in the first place within 20 years.

**TERRAIN FEATURES ANALYSIS**

- **Elevation**: Elevation has a profound influence on snowline as well as diversity of vegetation. Temperature decreases as the elevation increases. This study area was set at 700m, area as Case Study: 2/5/2003 An avalanche caused death of 4 people in Orsires, Valais, when they were skiing. The risk level on that region was determined to be 4. Terrain features for that region are that elevation is 1950 m, slope is 45.63°, aspect is Northeast. Even though no information about profile curvature and land cover, the known terrain features are sufficient to cause an avalanche, especially with the triggered by human activities.

- **Slope**: The steeper the slope is, the more gravity is trying to pull snow downhill. For avalanche, any slope that is steeper than 25° is considered steep. The shallow slope is able to allow an accumulation of snow. For this risk model, any slope between 25° and 60° is considered steep. The shallow slope is able to allow an accumulation of snow. For this risk model, any slope between 25° and 60° is considered steep. The shallow slope is able to allow an accumulation of snow. For this risk model, any slope between 25° and 60° is considered steep.

- **Aspect**: Aspect is defined to be cardinal direction, which are North, East, South, and West, as well as intermediate directions, which are Northeast, Southeast, Southwest, and Northwest. Aspect is considered to be essential for avalanche because of wind. For example, winds blowing from the Northern Hemisphere, northern slope receive less sunlight. From the other aspects, thus it is easier to form a slab avalanche. A slab avalanche tends to develop more persistent weak layers than a warm snowpack. (United States Forest Service, 2015). The greater the slope is, the more gravity is pulling snow downhill. For this risk model, any slope that is greater than 60° is considered steep.

- **Profile Curvature**: Profile curvature and land cover, the known terrain features are sufficient to cause an avalanche, especially with the triggered by human activities.

- **Land Cover**: The type of land cover and surface coverage also influence the strength of snowpack. Areas covered by trees, huge rocks, and large bushes could provide anchoring points for snow to attach the ground so that avalanche risk on these areas will be reduced. Because in order to cause avalanche, it needs more strength of snowpack and larger area to trigger it. While area that are relatively barren, or covered by perpetual snow, or grassland could not provide anchor points. Because the small friction at the interface of snowpack and steep slope, or grassland could not provide anchor points. Because the small friction at the interface of snowpack and steep slope, or grassland could not provide anchor points. Because the small friction at the interface of snowpack and steep slope, or grassland could not provide anchor points.