

Geodesy as a toolbox for better understanding the effect of the climate change on earth

There is no doubt that GNSS have modernized the life of a surveyor. From solely form a basis for geospatial data on terrestrial work, most countries nowadays benefits a lot from global systems. In this way, space geodesy with its fundamental infrastructure, is an essential tool for dealing with geospatial information all over the world.

Besides of forming the basis for geospatial information, space geodesy plays a crucial role also for earth observation from space in general.

During the last decades, we have seen an increasing trend for the worry about the effects of human-induced climate change. In Norway, sea level rise is a hot topic. The effect is however much more critical other places on earth due to continous post glacial land uplift in Norway. We are talking about countries that will be totally overflown, and it is hard to think of the consequences of such scenarios.

The Geodesist can't do anything to stop the effects of the climate change - that is for sure. The only thing that we can do is to observe the changes and form the basis for making better predictions of future scenarios. The goal must be to make so good predictions that decision makers may take necessary actions in due time.

The Earth is a constantly moving planet, and you cannot find a place on it, that is not in motion. When the goal is to predict forthcoming sea level changes with high certainty, it's necessary to observe the changes and to form time series with a precision down to millimeter basis. To do so, we need a precise global geodetic reference frame that is defined on the basis of all kind of geodetic techniques – data from so called “geodetic core network stations”. Simulations show that there is a need for among 30 core stations with an ideal distribution over the globe. The situation today is that we have large areas on the globe without stations at all.

Geodesy is not a subject that alone can form future scenarios for sea level changes, but no one can form such scenarios without Geodesy as a basis. This is

unfortunately a fact that is not well known to decision makers, ministries and others that are paying for research activities. The global cooperation within geodesy today is based on the best effort principle. The development of the needed 30 stations is then dependent on efforts in each country, also from developing countries. Norway spent five years to convince Norwegian politicians that the geodetic observatory in Ny-Ålesund should be upgraded to become a core network station. What can we expect from the developing countries, when it's so hard in Norway?

It's clear to me that a UN-resolution or even better a UN-convention would help on the situation. The human-induced climate change may cause severe damage and movements of people from one country to another. To make reliable decisions in due time, the politicians around the world will need reliable scenarios for the future. A global geodetic reference frame forms the basis for all kind of earth observation and is dependent of the development of among 30 core network stations around the world. Shall we succeed to establish such a needed reference frame, it's necessary to improve the global cooperation within geodesy by going away from the best effort principle and move towards some global demands from an organization like the UN.

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