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## Background

Acute high altitude vision loss as described in several case reports is extremely dangerous due to spontaneous severe low vision or complete blindness. Beside ultraviolet radiation, cold air is assumed to be responsible resulting in so called “freezing eyes” <sup>(1-3)</sup>

## Purpose

To determine the effect of cold environmental air to the ocular surface temperature.

## Method

Ocular surface temperature (OST) of fifteen healthy voluntary mountaineers (5 women and 10 men) were measured at environmental air temperatures (AT) between +23°C and -22°C by non-contact Infrared-Thermometry (Voltcraft IR-280-4ET), in a series of high altitude expeditions to the Alps, the Andes and the Himalaya at different altitudes between 3000m and 8848m above sea level.

## Results

Changes in Ocular surface temperature (OST) and air temperature (AT) correlated in a non-linear regression to each other (Pearson corr. 0.973). The OST decrease between +23°C and -22°C was statistically significant (p=0.012). A clinical view on the results proof that OST remain stable at +34°C (+/- 0.1°C) between an AT of +23° to +14°C, slowly decreasing OST to +30.6°C at -3°C and decrease to +24.8°C at an AT of -22°C.

## Conclusion

**In our cohort of healthy volunteers, very cold air at high altitude reduced the ocular surface temperature significantly.**

**The endpoint of the Ocular Surface Temperature is still high above freezing temperatures.**

It can be assumed, that it is very unlikely that eyes can freeze as long as the subject is alive.

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## References

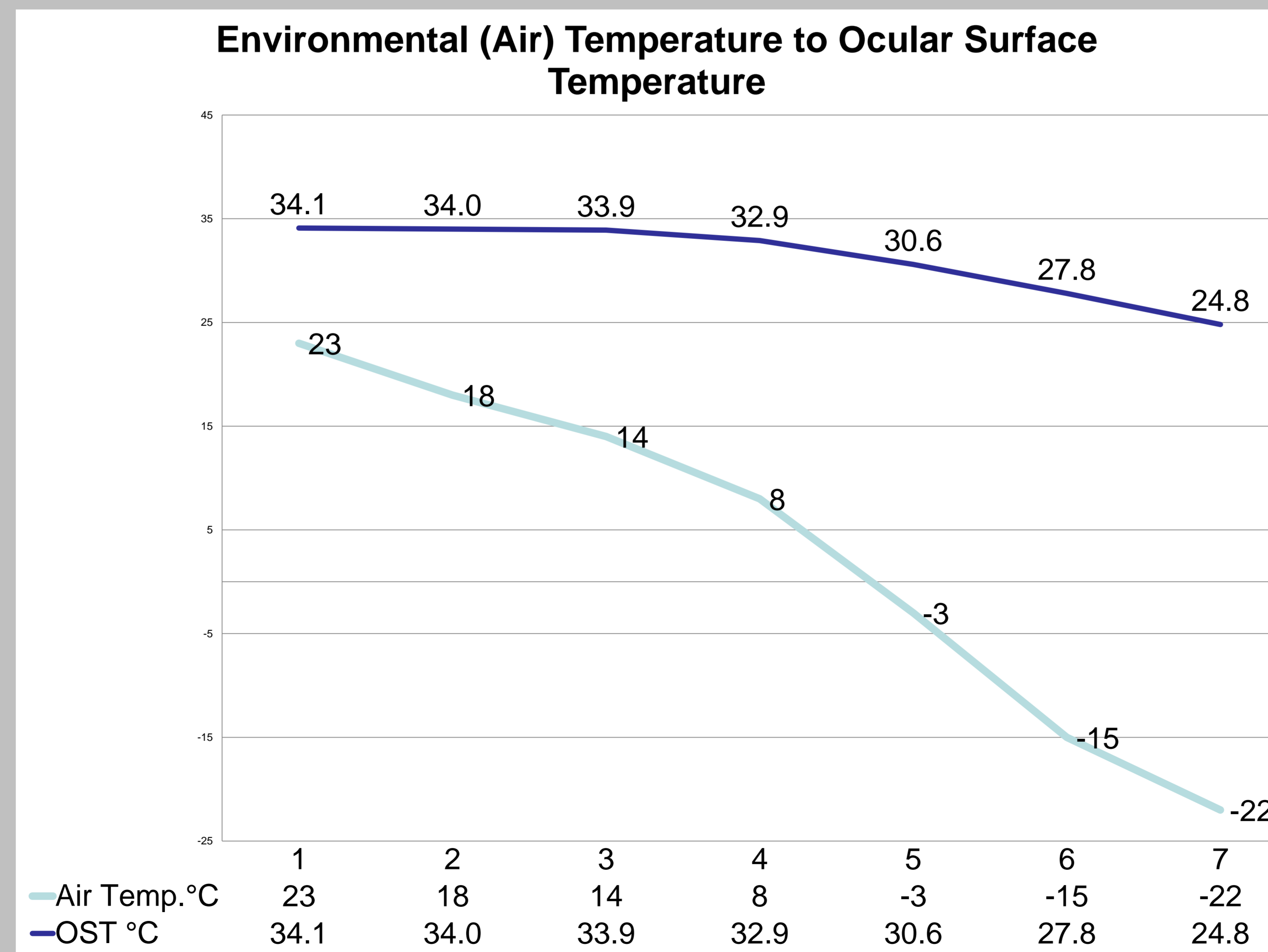
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**Figure 1. Infrared –Thermometry at summit Mt. Everest 8848 m**



**Table 1. Relationship of Air Temperature to Ocular Surface Temperature n=15**