

## **Abstract**

*This paper aims to find out the difference of human photoplethysmography (PPG) morphological parameter  $K$  between in normal oxygen concentration regions and in low oxygen level environments. We implemented an experiment with a normobaric hypoxic chamber which generalized low oxygen level environment of 12.7% (equivalent to the altitude of 4000 m). The experiment contained two sections—10 minutes short exposure and a night of sleep. Fingertip PPG signal was recorded in the whole process. We carried out a comparative analysis for each subject in normal and hypoxic conditions. Result showed that the average  $K$  values in normoxic environment and hypoxic conditions for short exposure were 0.3456 and 0.3861 respectively, and for sleep were 0.3081 and 0.3419 respectively. Significance level  $p$  were both less than 0.05. Variations of PPG waveform parameter  $K$  reflect the changed peripheral vascular resistance. In hypoxic environment, the raised  $K$  value tallied with the physiological mechanism that hypoxic exposure increases peripheral vascular resistance. And this phenomenon happened since the beginning of hypoxia and could last for at least a night.*