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Estimation of the Sea Surface Temperature from Aircraft

B. H. KWON[1], B. BENECH[2], P. DURAND[3], and Y. S. KIM[4]

[1]*Dept. Of Environmental Atmospheric Sciences, Pukyong National University, Busan, Korea*
[2]*Centre des Recherches Atmospheriques, Lannemezan, France*
[3]*Laboratoire d'Aérologie, Toulouse, France*
[4]*Dept. Of Satellite Information Sciences, Pukyong National University, Busan, Korea*

The experiment was conducted around south of the Azores islands, in the middle eastern part of the northern-Atlantic basin. The experimental area was situated between 31°N-38°N and 21°W-28°W. The experiment was performed in order to improve our knowledge of ocean-atmosphere interactions from the local-scale to the meso-scale. The sea surface temperature remotly measured by aircraft was corrected considering the radiation flux divergence.

$$\underset{\text{I}}{\sigma T_a^{\,4}} = \underset{\text{II}}{\varepsilon\lambda\sigma\left(SST_\lambda\right)^4} - \underset{\text{III}}{\Delta\left[\varepsilon\lambda\sigma\left(SST_\lambda\right)^4\right]_0^z} + \underset{\text{IV}}{\left(1-\varepsilon\lambda\right)IR^{de}_{\lambda\,(z)}}$$

where the term I is the radiation measured by the Barnes PRT5 at the flight level, the term II is to be found (unknown: $\varepsilon\lambda$ and T_λ) and the term III can be evaluated statistically at the different altitudes. In the term VI $\varepsilon\lambda$ is unknown and $IR^{de}_{\lambda(z)}$ is measured. When $\varepsilon\lambda \neq 0$, the spatial variation of $IR^{de}_{\lambda\,(z)}$ results in the variation of T_a. Figure 1 shows the descending IR flux in function of the difference between the surface temperatures measured from the ship and the aircraft (SST_{ship}–$SST_{aircraft}$): the difference decreases when the IR flux increases.The sea surface temperature was corrected of the radiation flux divergence of the atmosphere between the sea surface and the flight level. The cloudness plays an important role in this correction. The comparison between SST of the ship and the SST of the aircraft shows a difference of 1°C on average which is affected of the descending infrared flux (0.25°C per 100 m).

Keywords: Sea Surface Temperature, Radiation Flux, Infrared Radiation, aircraft

References

[1] Kwon, B.H., Benech, B., Lambert, D., Durand, P., Druilhet, A., Giordani, H., and Planton, S., 1998, Structure of the marine atmospheric boundary over an oceanic thermal front: SEMAPHORE experiment, Journal of Geophysical Research, **103**, 25,159-25,180.