

# WCRP Open Science Conference, 24-28 October 2011, Sheraton Denver Downtown Hotel, Denver, CO, USA

## Use of spectral irradiances measured at the surface of SKYNET sites to study aerosol optical properties and aerosol direct effects

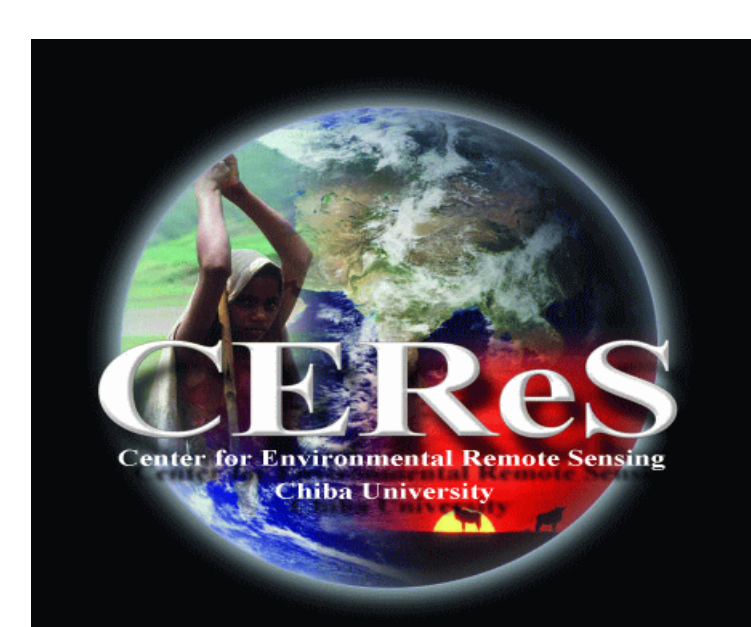
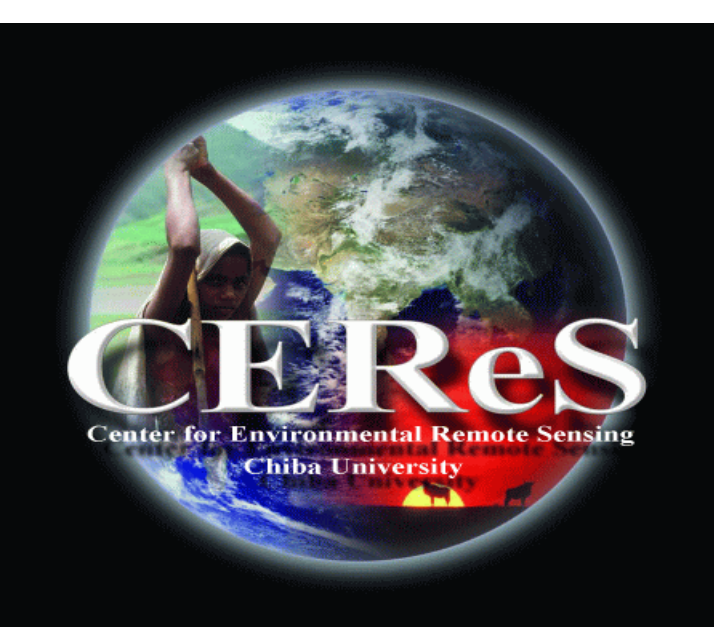
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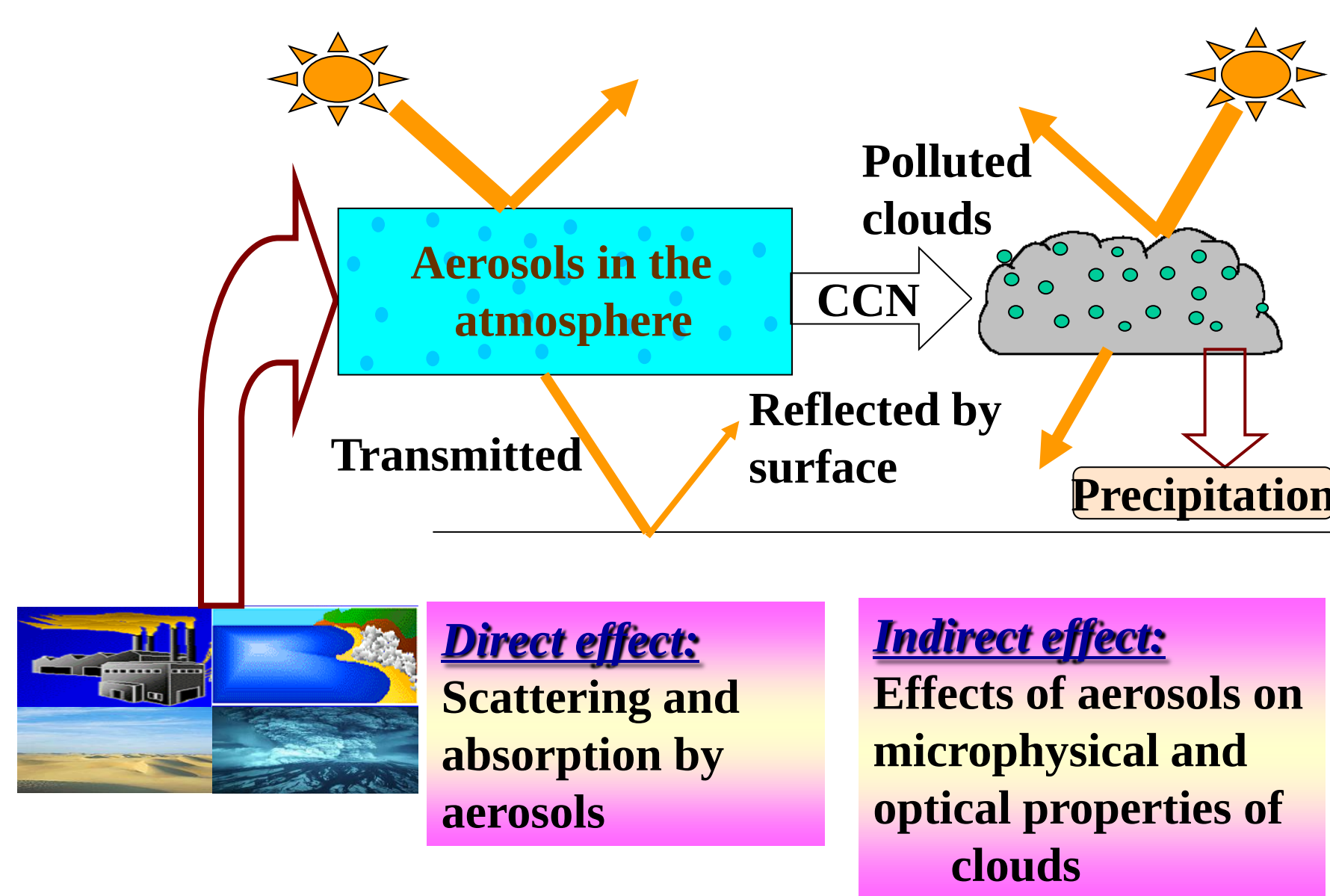
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## 1. Background



The roles of aerosols and clouds on regional and global climate change are still not clearly understood

## Aerosols in the Asian region

1. The Asian aerosol sources are unlike those in Europe and North America: much more coal and biomass are burned adding more absorbing soot and organic aerosols to the atmosphere.
2. The rapid industrialization of the Asian countries further causes the amounts of anthropogenic aerosols such as soot, sulfate, nitrate, organic matters to increase.
3. East Asia is also one of the important sources of dust aerosol, which further adds complexity.
4. The amounts of aerosols in the atmosphere of the East Asia are predicted to further increase in the future.

It is well known that the East Asian aerosols can have impacts on climate system, but the major question of how are they linked with climate system still remains unanswered.

## SKYNET network

•SKYNET is an observation network to study aerosol, cloud, and radiation interaction in the atmosphere.

For detail, visit <http://atmos.cr.chiba-u.ac.jp/>

•Major instruments for aerosol observation

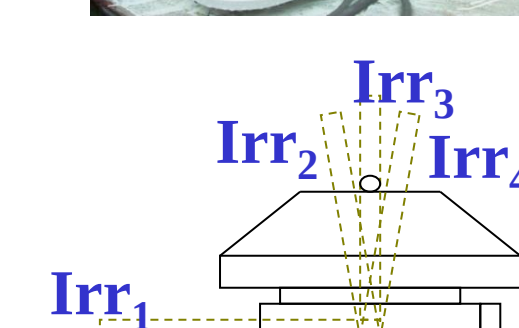
### Sky radiometer



Sky radiometer is being operated at more than 50 sites around the world

Manufacturer  
PREDE Co. Ltd., Japan  
Data analysis software  
Skyrad.pack (Nakajima et al., 1996)  
Cloud screening software  
CSSR (Khari and Takamura, 2009)

### Shadow band attached spectroradiometer



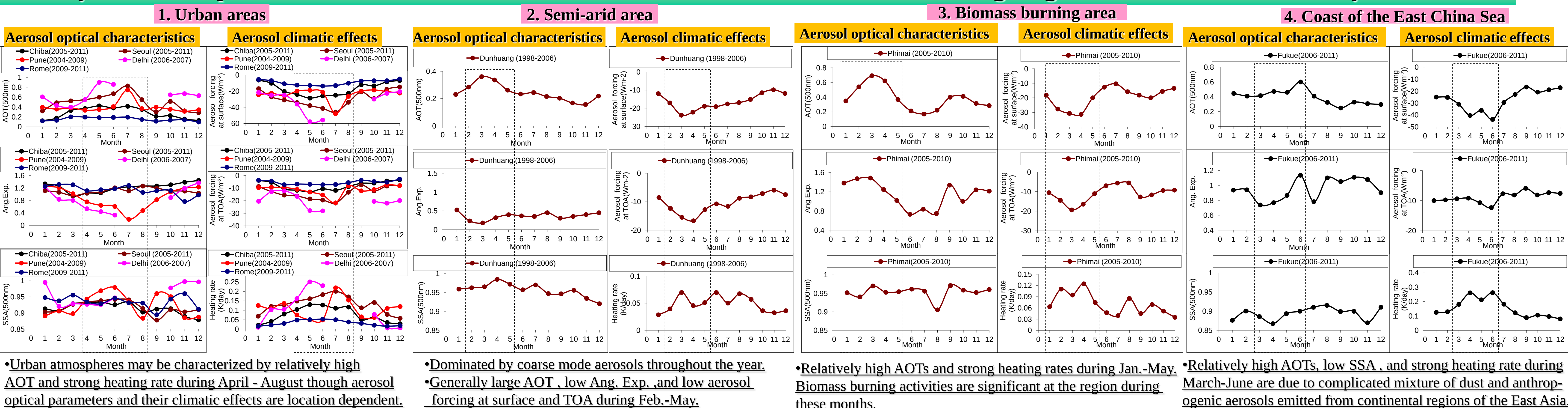
Recently installed at 4 SKYNET sites within Japan

Manufacturer  
EKO Co. Ltd., Japan  
Data analysis software  
MS700analysis (Khari et al., 2011)

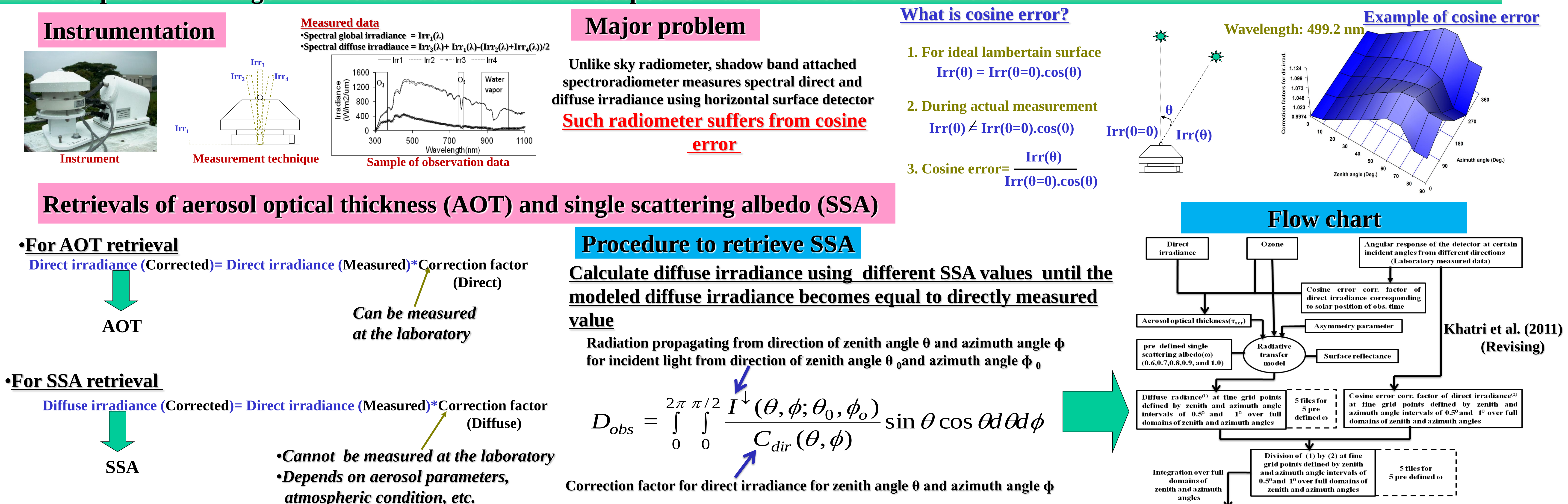
## 2. Purposes of this study

- Study the optical characteristics of the aerosols and their climatic effects at some important SKYNET sites using long term observation data of sky radiometer, which is a key instrument of SKYNET network.
- Develop a data analysis tool (algorithm) for newly installed observation system (shadow band attached spectroradiometer) at some SKYNET sites.

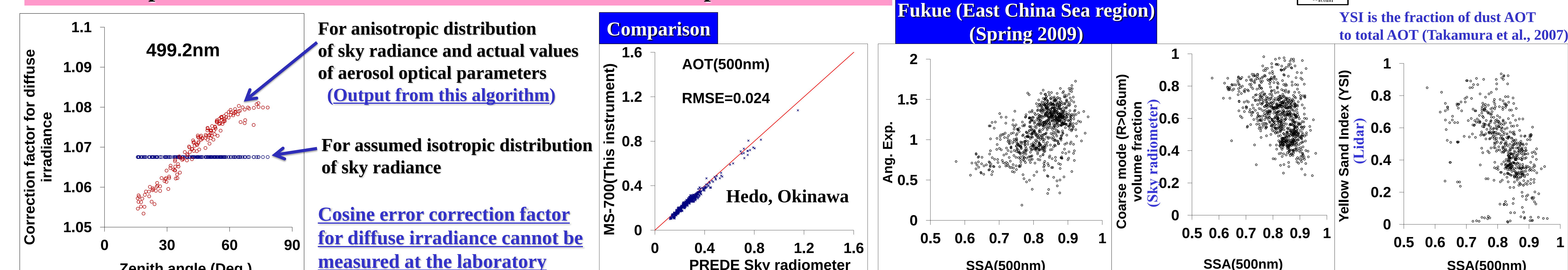
## 3. Study of aerosol optical characteristics and their climatic effects at some SKYNET sites using long term observation data of sky radiometer



## 4. Development of an algorithm for shadow band attached spectroradiometer of SKYNET network



## Some examples of results obtained from shadow band attached spectroradiometer



## 5. Acknowledgements

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