Bimodal distribution classifying habitat type using atmospheric data from field sensor

Wittaya Pheera

Peerasak Sangarun

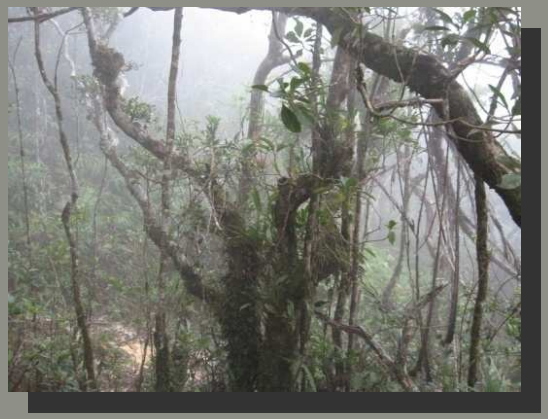
Assoc. Prof. Mullica Jaroensutasinee

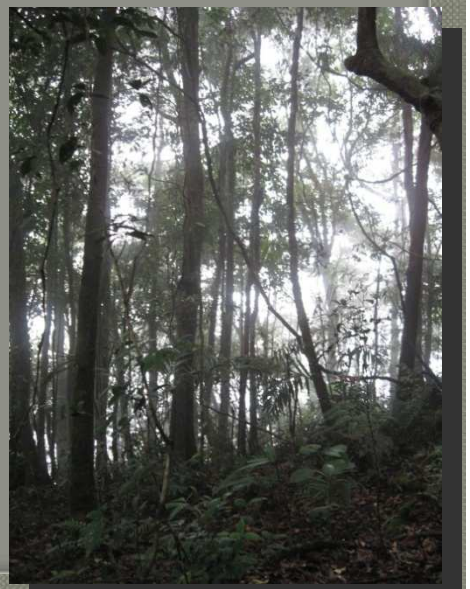
Asst. Prof. Krisanadej Jaroensutasinee

Centre of Excellence for Ecoinformatics, School of Science, Walailak University

Introduction

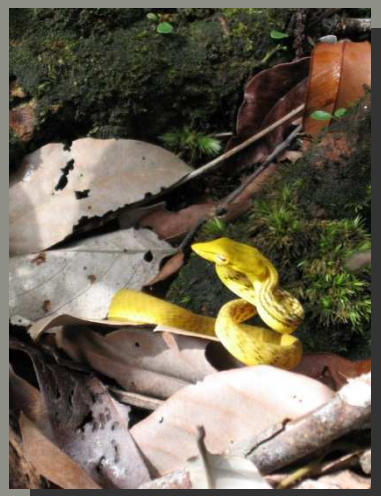
- Temperatures are usually cool throughout the year.
- Normally not found below 1000 metres.
- Trees are normally shorter than other areas and covered in mosses, lichens and ferns.





Why cloud forests are so important?

- Cloud forests play an important role in hydrological cycle.
  - Cloud forests are the habitat for endemic species.



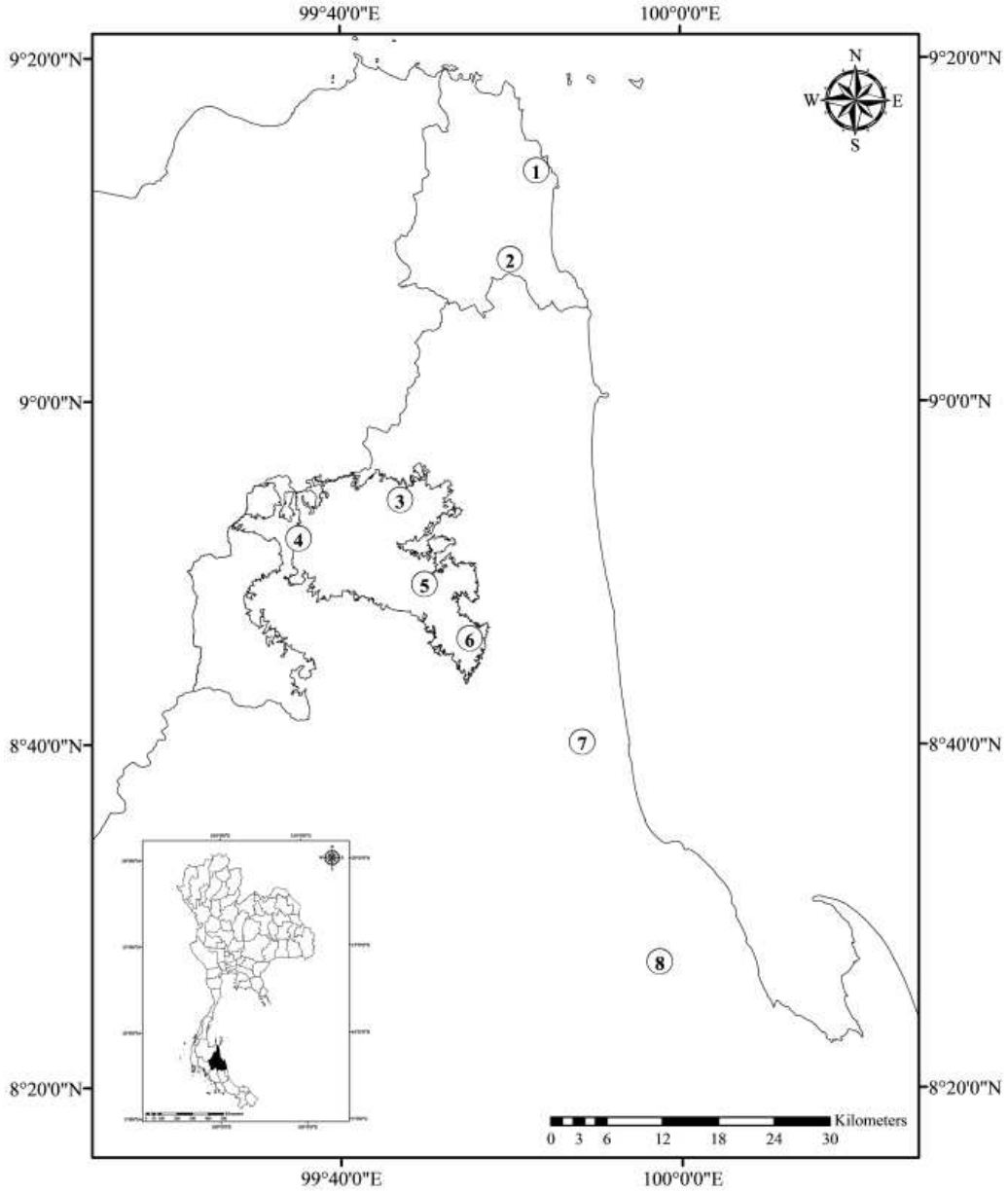

Cloud forest study in Thailand

- Most of Thai people never heard/know about cloud forest.
- There are only few studies about cloud forest in Thailand.

Methodology

- There were nine study sites grouped into three habitat types.
  - Davis Vantage Pro II Plus automatic weather stations were different periods installed at each study site.

Coastal Sites	*Tropical Forests*	*Cloud Forests*
Maueng, NST *(Jun, 2006)*	Huilek *(Nov, 2006)*	Duan Hok *(Mar, 2007)*
Walailak University *(Aug, 2006)*	Mt. Nan Headquarters *(Sep, 2007)*	Doi Intanon *(Mar, 2008)*
Khanom *(Sep, 2007)*		Dadfa *(Jan, 2009)*
		Mt. Nom *(Jan, 2009)*



Map of eight study sites in Nakhon Si Thammarat.

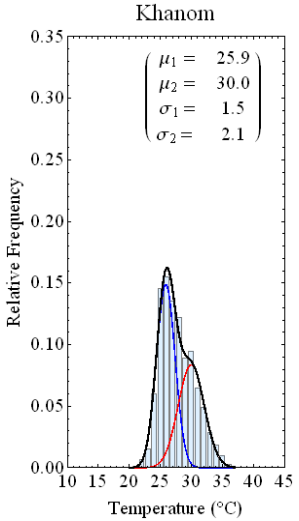
The bimodal distribution is given by …

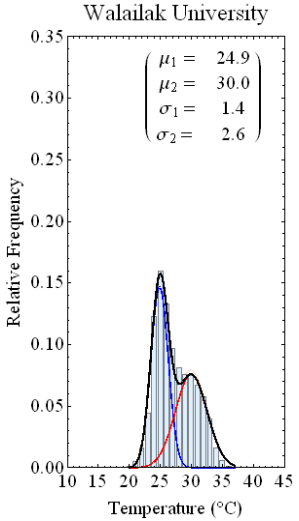
$$f_N(x_1, x_2) = \frac{1}{2\pi\sigma_1\sigma_2\sqrt{1-\rho^2}} \exp[-\frac{z}{2(1-\rho^2)}]$$

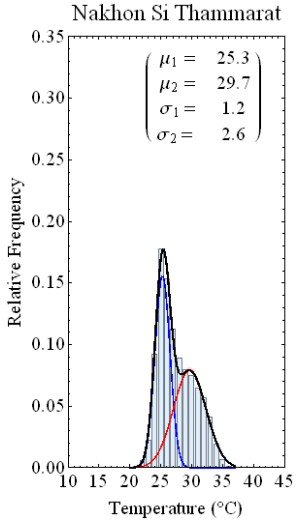
$$z = \frac{(x_1-\mu_1)^2}{\sigma_1^{\,2}} - \frac{2\rho(x_1-\mu_1)(x_2-\mu_2)}{\sigma_1\sigma_2} + \frac{(x_2-\mu_2)^2}{\sigma_2^{\,2}} \quad , \quad \rho = \frac{V_{12}}{\sigma_1\sigma_2}$$

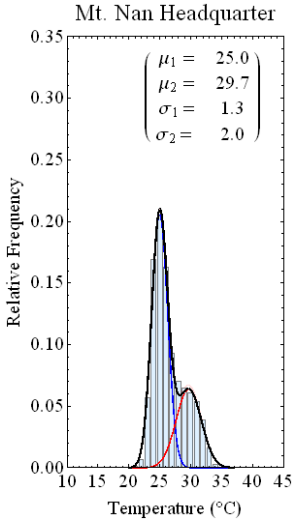
Results

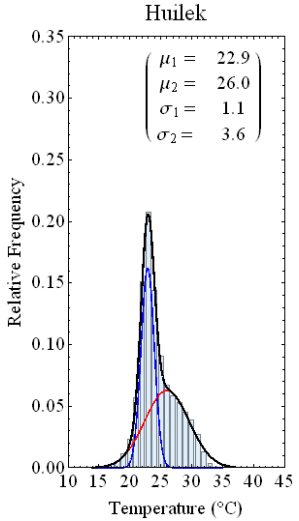
Study site	*Temperature (°C) ± SD*	*Relative Humidity (%) ± SD*	*Heat Index (°C) ± SD*
Khanom	27.34 ± 2.70	81.24 ± 10.62	30.83 ± 4.39
Walailak	27.58 ± 3.11	80.76 ± 13.76	30.02 ± 4.76
Nakhon Si Thammarat	27.73 ± 2.79	81.55 ± 12.84	30.46 ± 4.50
Headquarters	25.64 ± 2.44	86.27 ± 10.35	29.12 ± 4.11
Huilek	23.80 ± 2.82	91.78 ± 9.43	26.39 ± 4.19
Dadfa	21.43 ± 2.18	92.29 ± 8.70	24.31 ± 2.39
Duan Hok	20.85 ± 1.37	94.31 ± 6.82	21.26 ± 1.90
Mt. Nom	19.32 ± 2.46	89.55 ± 11.15	19.95 ± 2.82
Doi Intanon	13.10 ± 2.21	80.19 ± 27.45	11.74 ± 2.57





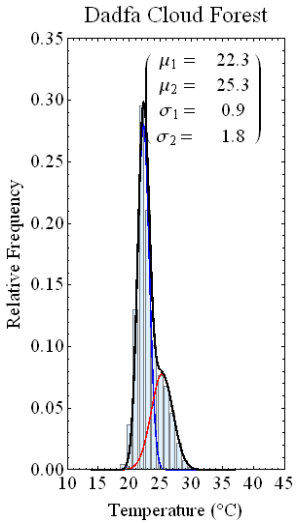


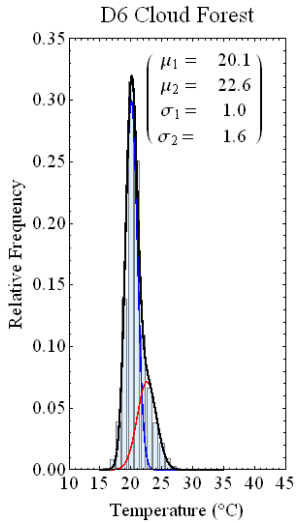


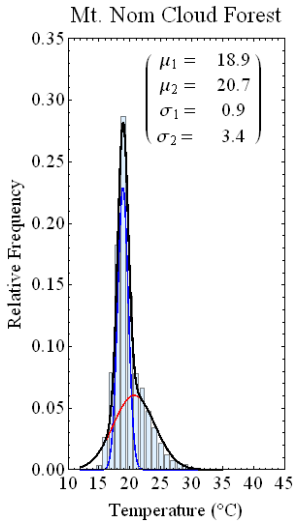


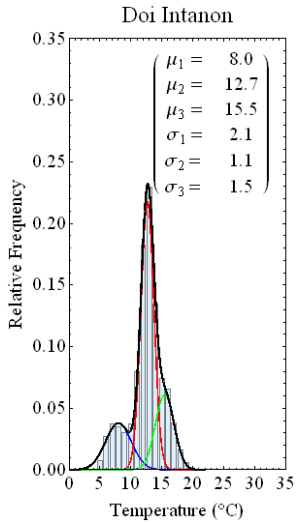
"Coastal Sites"

"Tropical Forests"



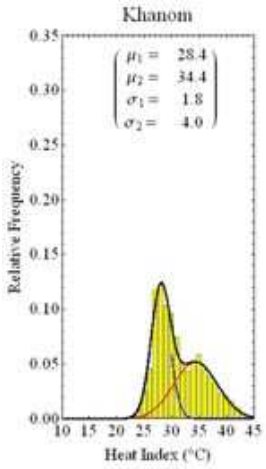


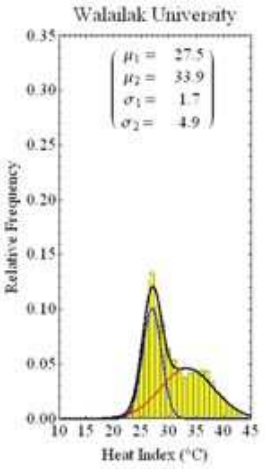


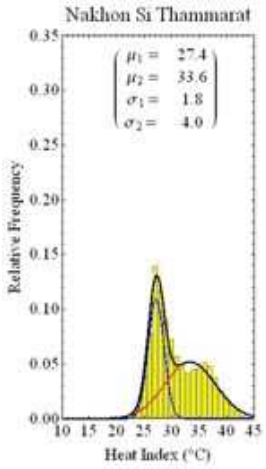


"Cloud Forests"

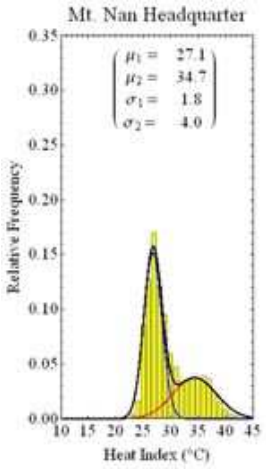
Temperature

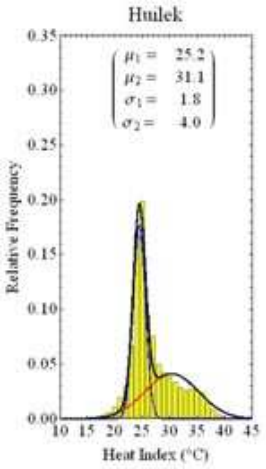




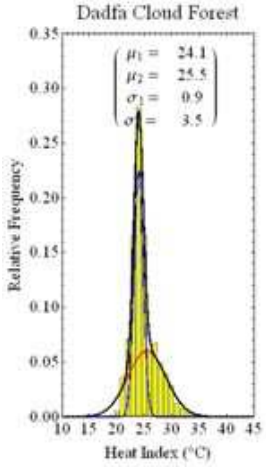


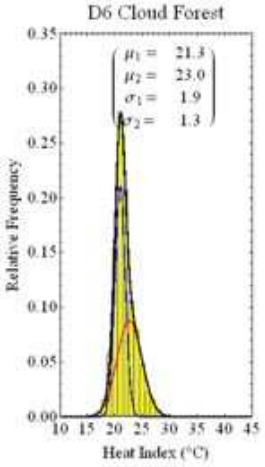
"Coastal Sites"

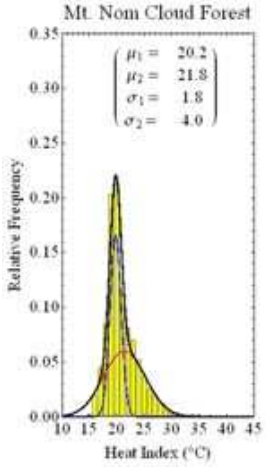


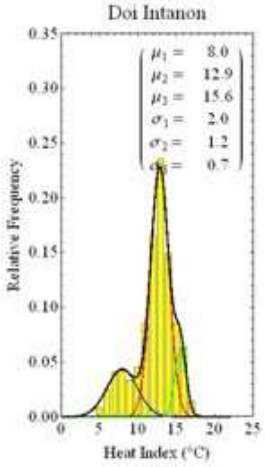


"Tropical Forests"



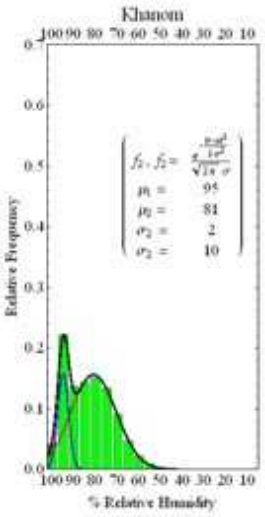


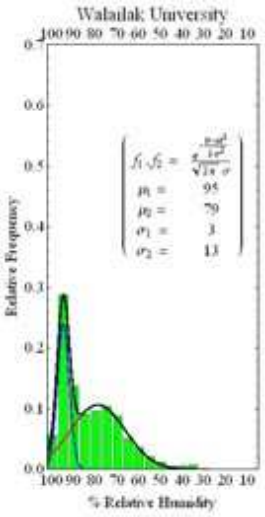


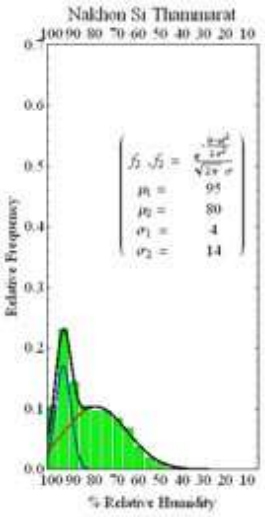


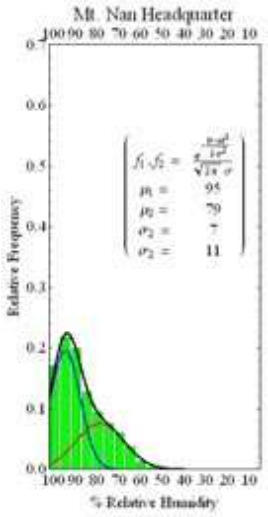
"Cloud Forests"

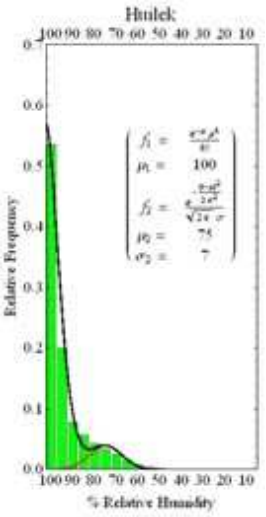
Heat Index





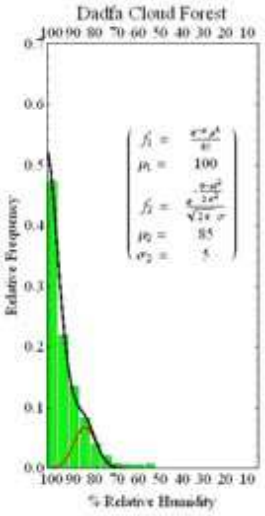


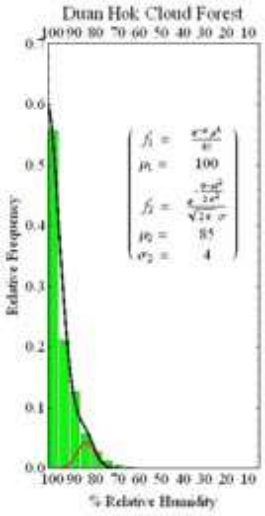


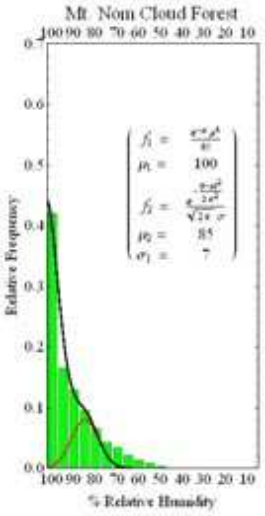


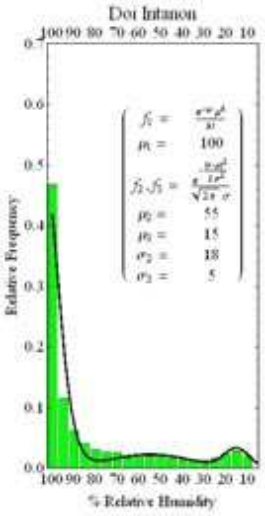
"Coastal Sites"

"Tropical Forests"









"Cloud Forests"

Relative Humidity

Conclusion

- From nine study sites, climatic factors can group study sites into two categories:
  - Cloud forest sites
  - Tropical forests & three coastal sites

- We can use the data from field sensors to analyse the weather variation to better understanding the climate characteristics differences in different habitat types.

Acknowledgements


IRD-WU


- Institute of Research and Development (IRD), Walailak University (WU)
- Biodiversity Research Training (BRT) program
- PTT Public Company Limited
- Center of Excellence for Ecoinformatics, NECTEC-WU
- Khao Nan National Park staffs

Thank you for your attention