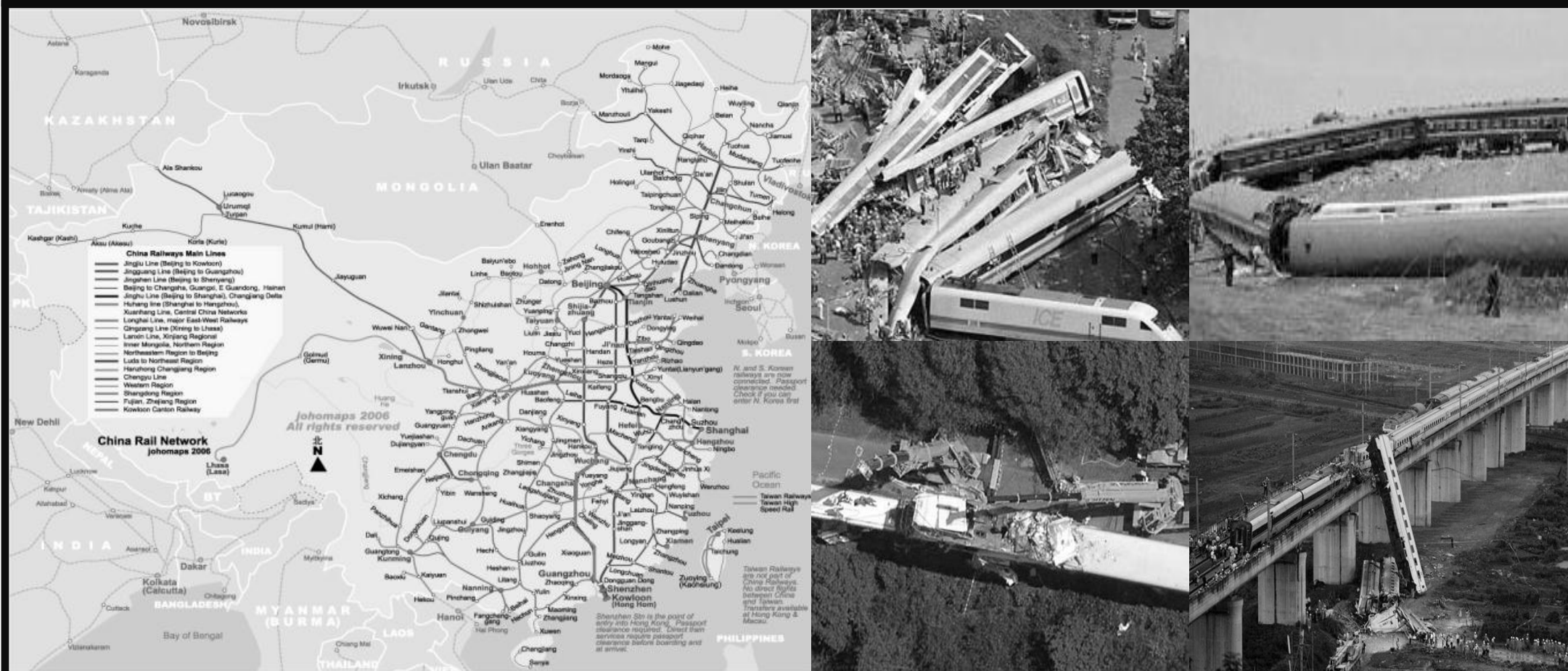


Propagation Issues for High-Speed Railways

Ruisi He, Zhangdui Zhong, and Bo Ai, Beijing Jiaotong University, China

Andreas F. Molisch, University of Southern California, USA

Motivation

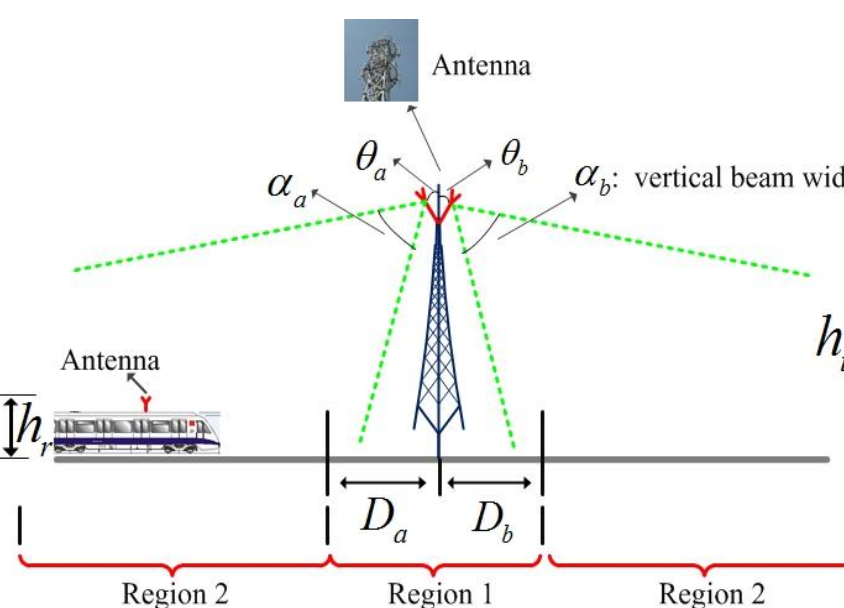
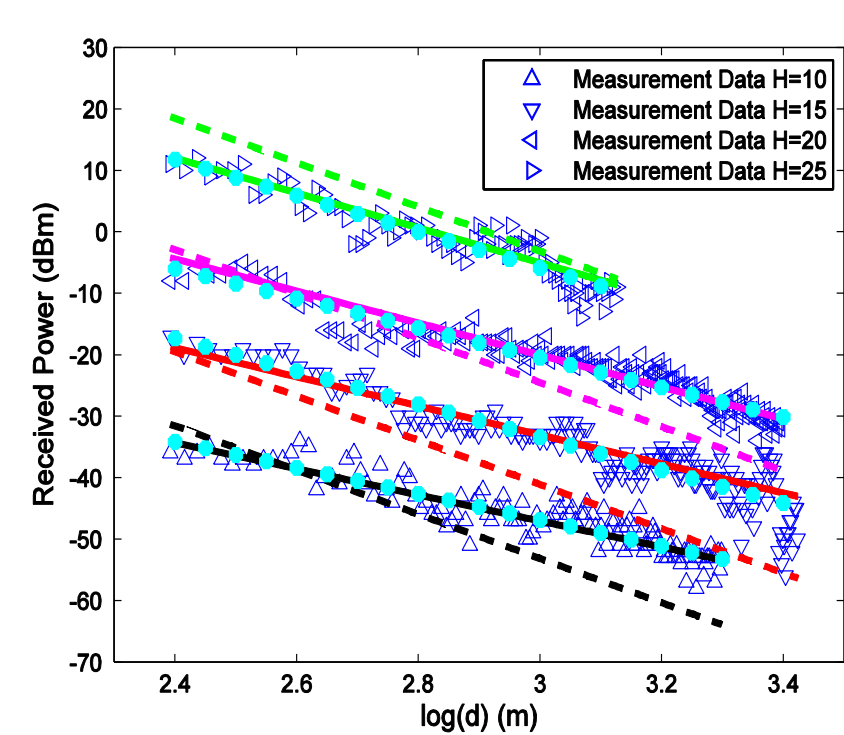


In China, by 2020:

- ✓ 120,000 km – rail lines
- ✓ 16,000 km – HSR

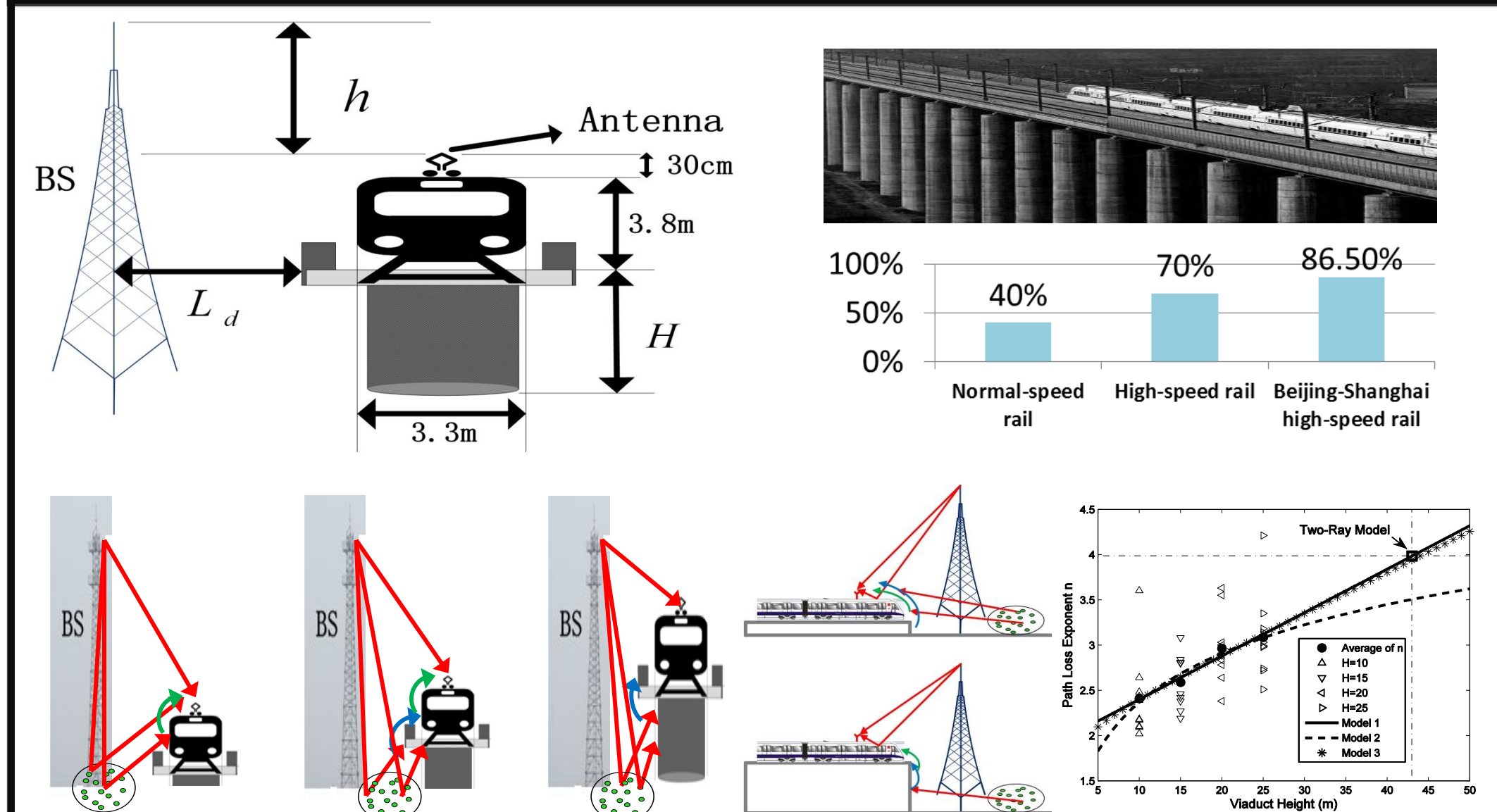
- ✓ Over 95 disasters since 1990
- ✓ Over 52.6% accidents caused by the hit between trains

Railway Scenarios



- ✓ Different propagation environments
- ✓ Different setup of antennas

Viaduct Channels

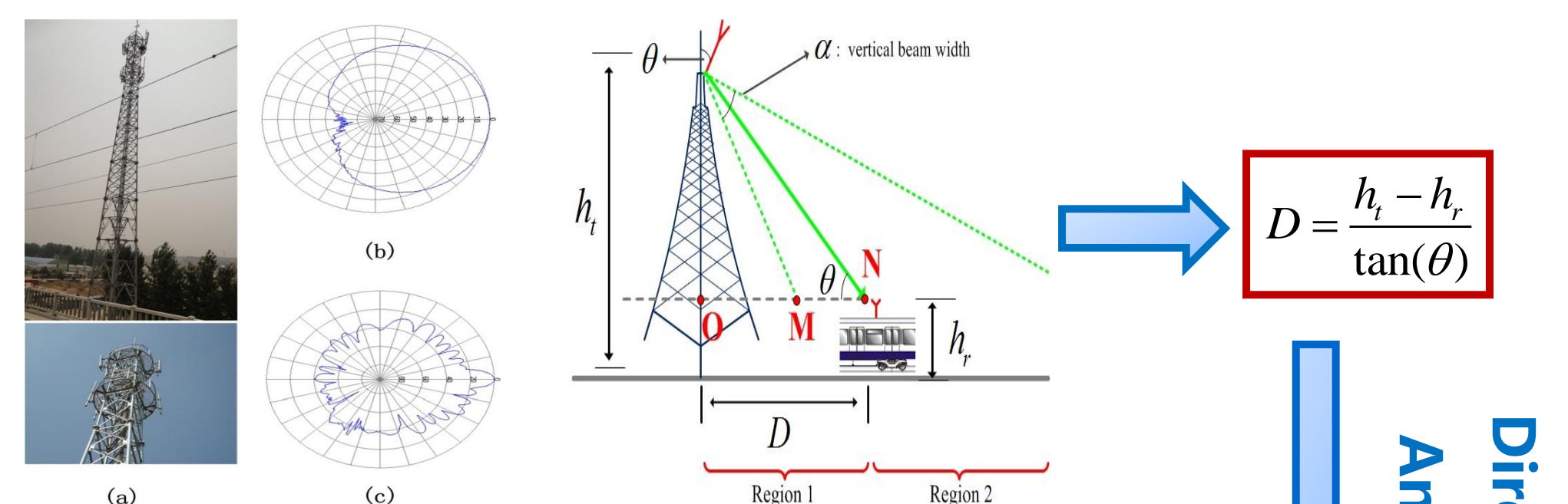
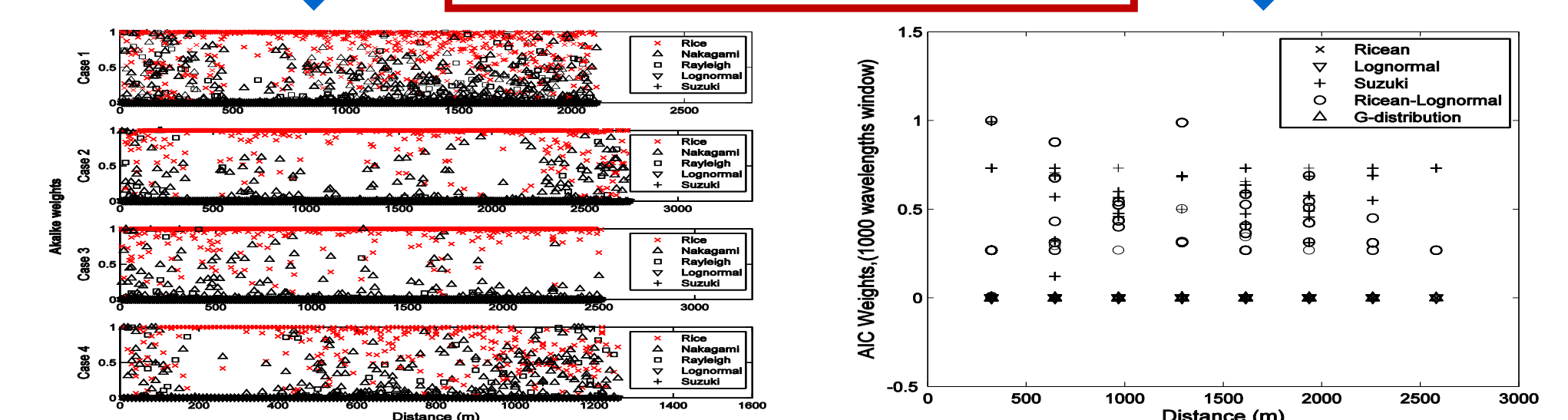


Ricean

$$AIC_j = -2 \sum_{n=1}^N \log_e \left[g_{\hat{\theta}_j} (x_n) \right] + 2U$$

$$w_j = \frac{\exp(-\Phi_j/2)}{\sum_{i=1}^J \exp(-\Phi_i/2)}$$

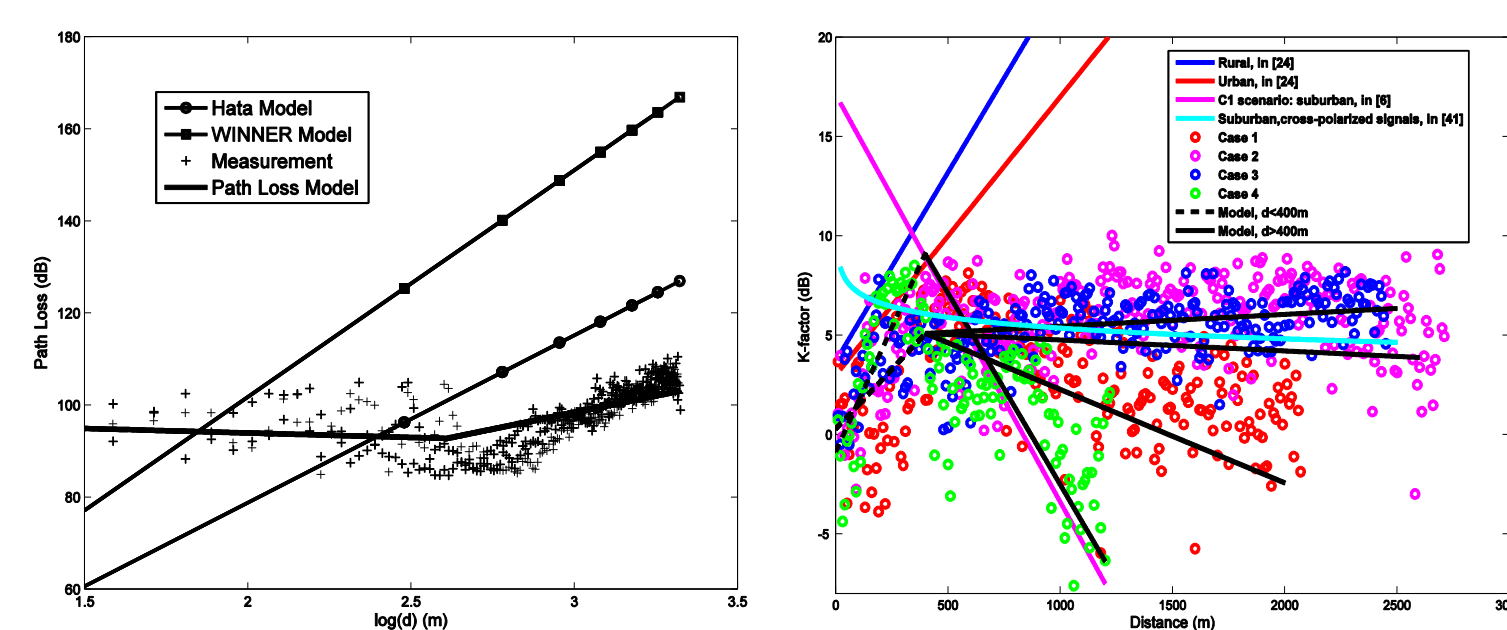
Suzuki



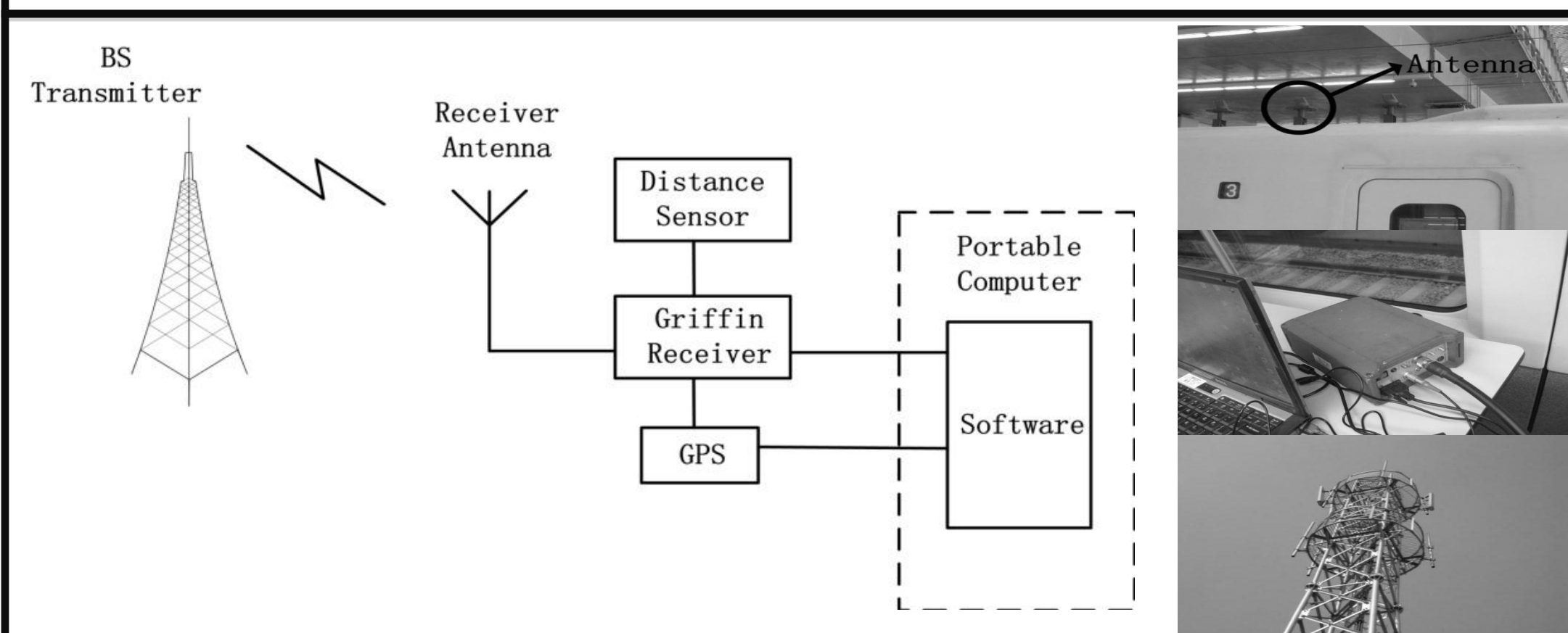
$$D = \frac{h_t - h_r}{\tan(\theta)}$$

Directional Antennas

Piecewise Models



Measurement Campaign



Future Work

