

Ocean Wind Retriving Under Rainy Conditions for HSCAT onboard HY-2A

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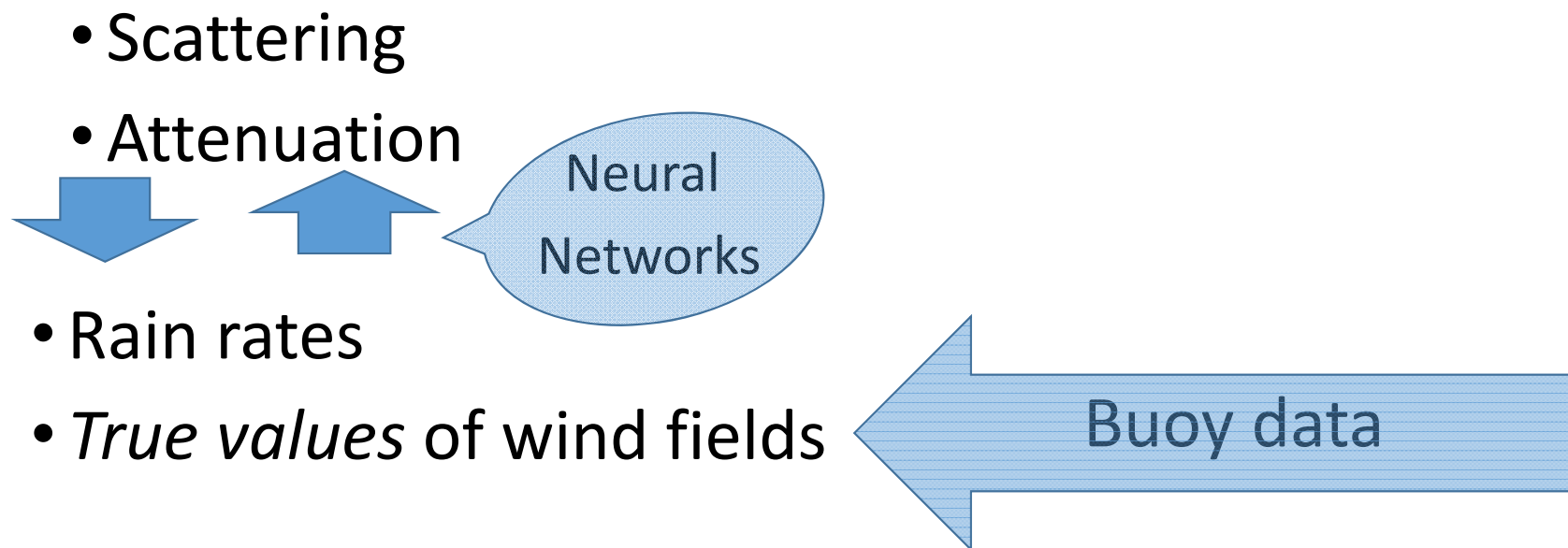
国家卫星海洋应用中心
National Satellite Ocean Application Service

Outlines

- Introduction
- Method
- Experiment
- Results and Discussion

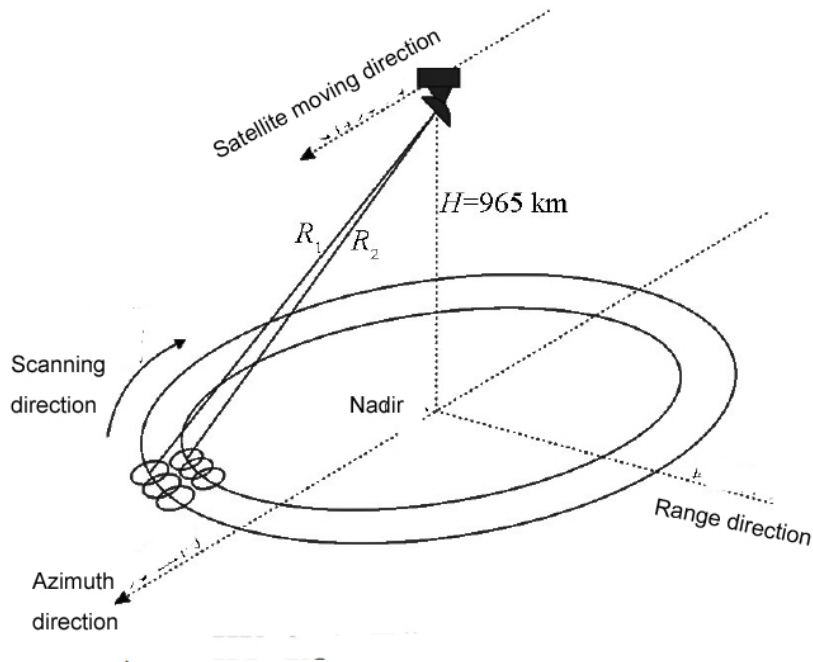
Introduction

Ku band scatterometer signals meet rains :



Introduction: HSCAT

HY2A Scatterometer (HSCAT)



Schematic diagram of the HY-2A scatterometer observation

The technical specification of HSCAT

Parameters	Specifications	
Working Frequency (GHz)	13.25	
Swath(km)	Outer beam: ≥ 1700	Inner beam: ≥ 1400
Resolution (km)	25	
Sigma0 measuring accuracy (dB)	0.5	

Introduction: Data Used

Data	Description
HSCAT L2A	Sigma0s of return pulses with wind cell(30km) IDs, pulse directions, polarizations, and observing geometry (2013, June, July, Aug. in 2015)
HSCAT L2B	HSCAT wind field product (2013, June, July, Aug. in 2015)
TRMM	3hr interval, 0.25° (Lon.) \times 0.45° (Lat.) (2013)
GPM	0.5hr interval, 0.1° \times 0.1° (June, July, Aug. in 2015)
Buoy data	All Moored buoys(2013, June, July, Aug. in 2015)

Introduction: Data matching

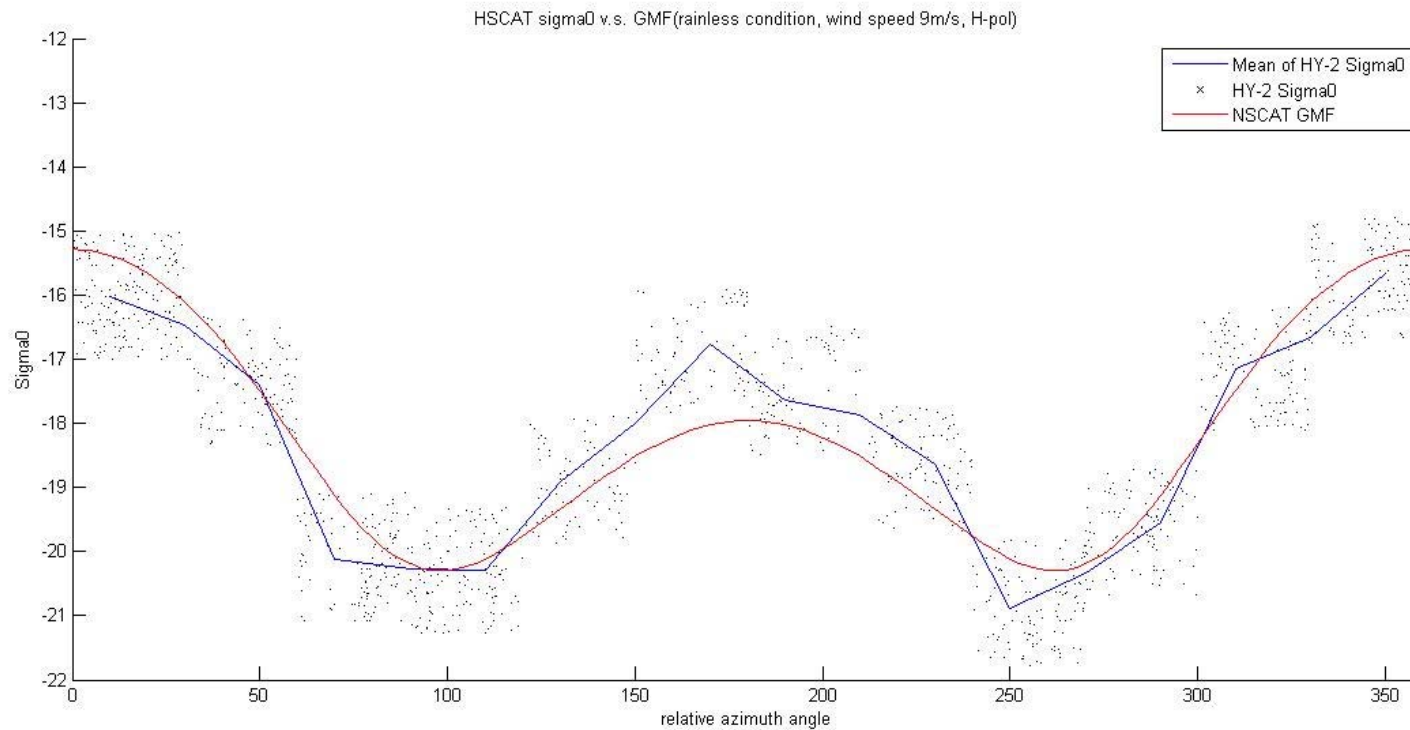
Analysis & Training data: Matched with reference to wind cell, spacial interval $\leq 25\text{km}$, time interval $\leq 45\text{min}$

Verification data: Matched with reference to wind cell, spacial interval $\leq 25\text{km}$, time interval $\leq 30\text{min}$

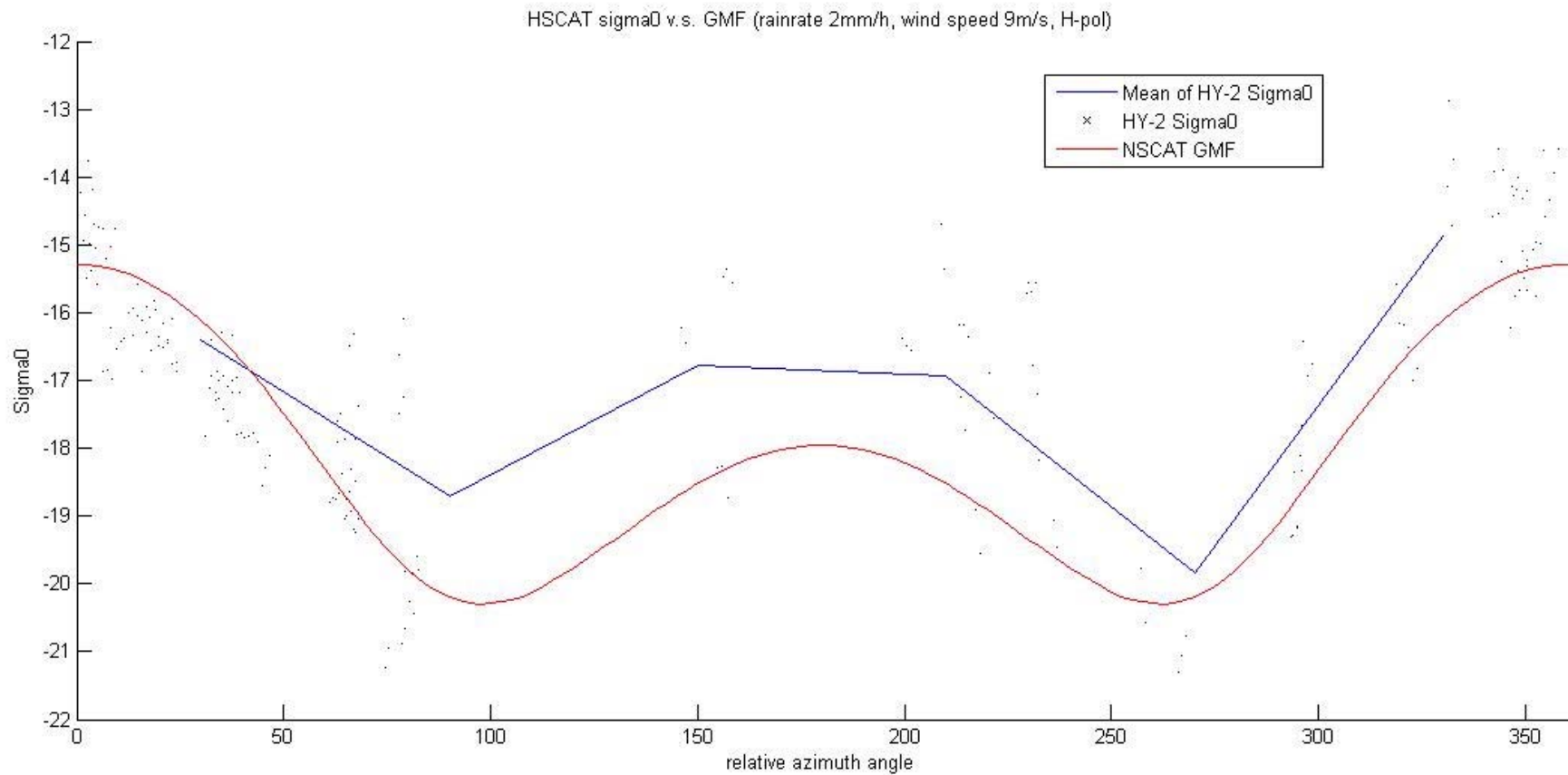
Method

HSCAT in good accordance with GMF without rain

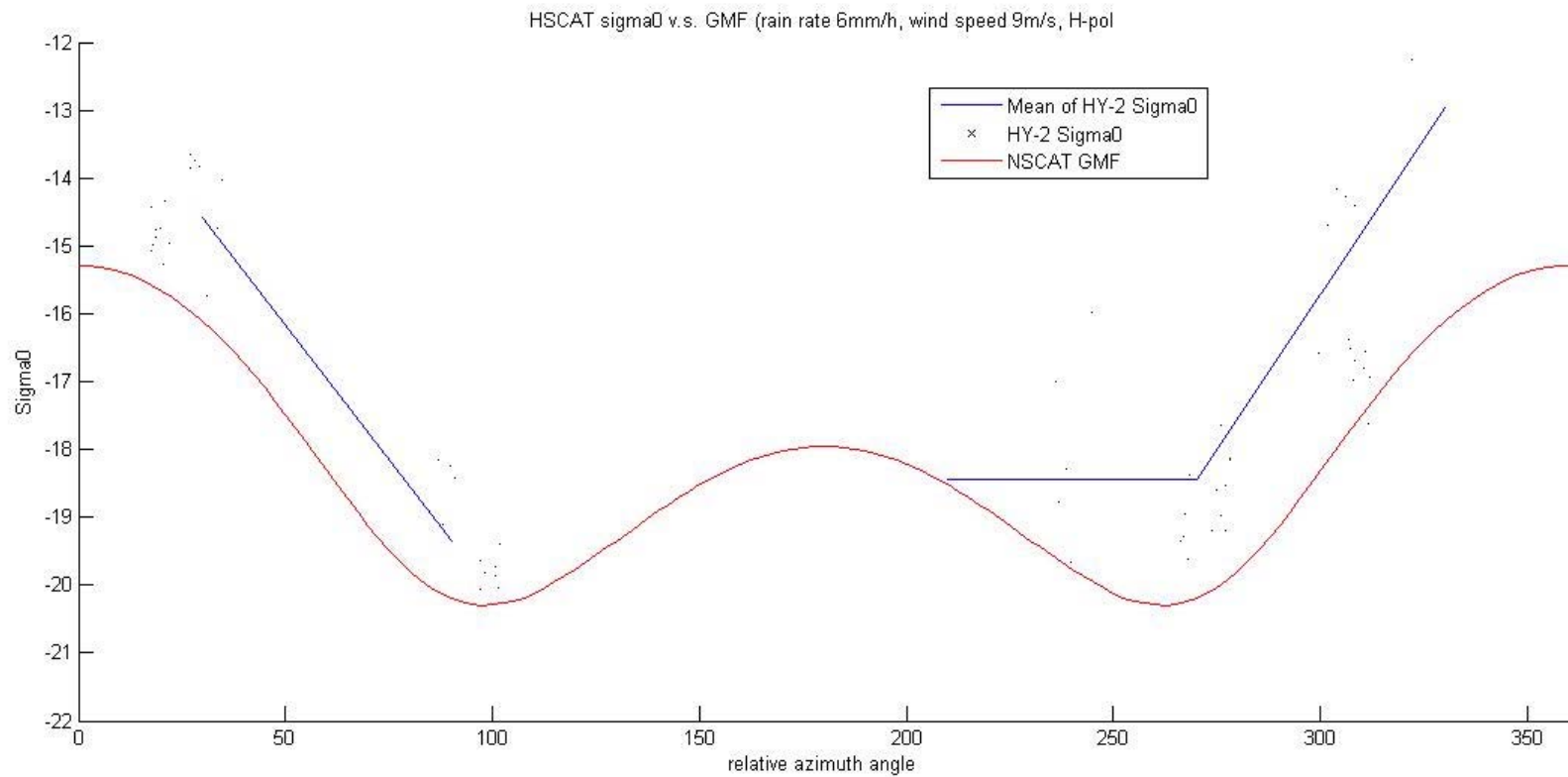
1 rain effect analysis



rain effect analysis(2013 data set)

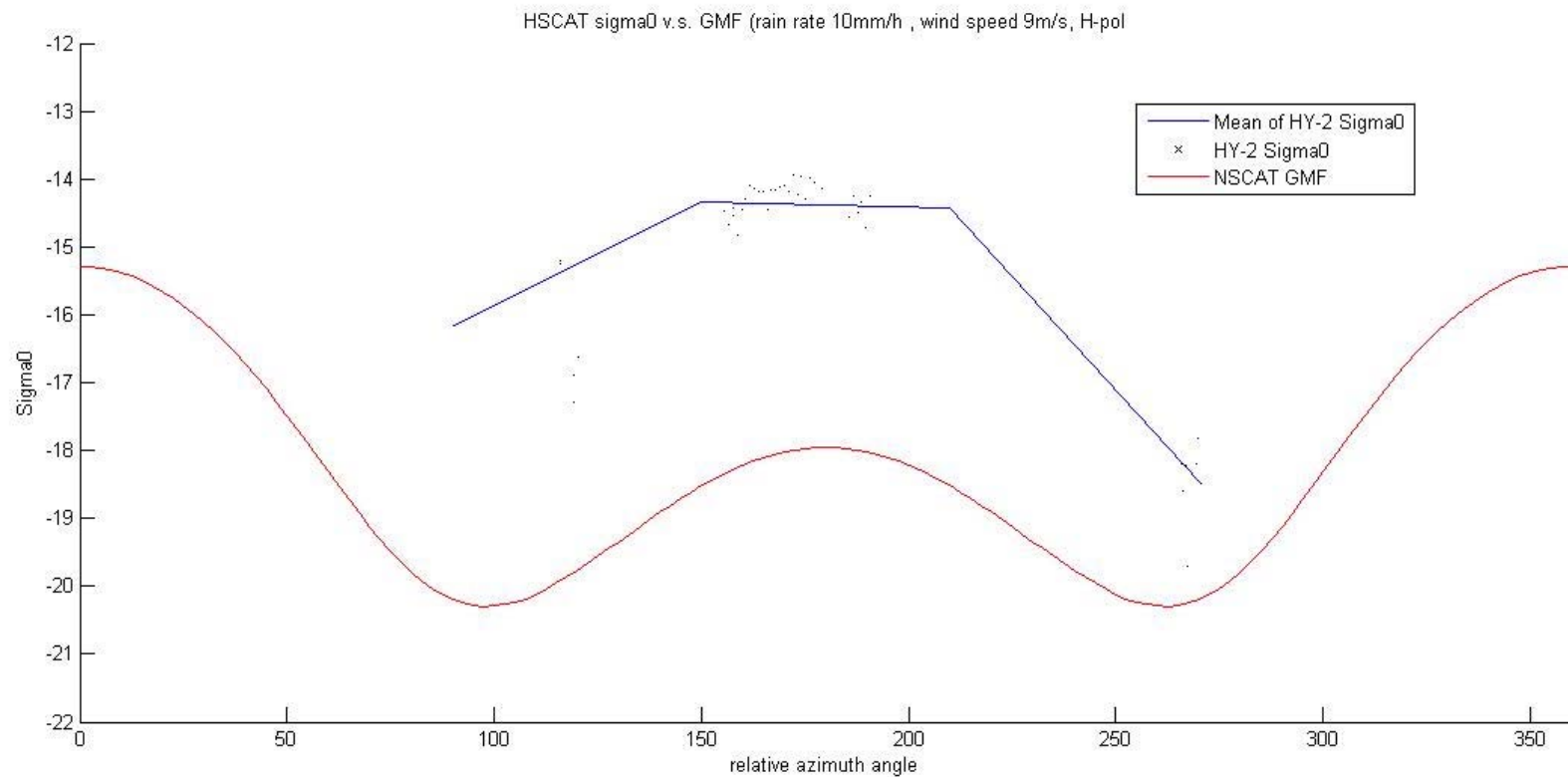


rain effect analysis

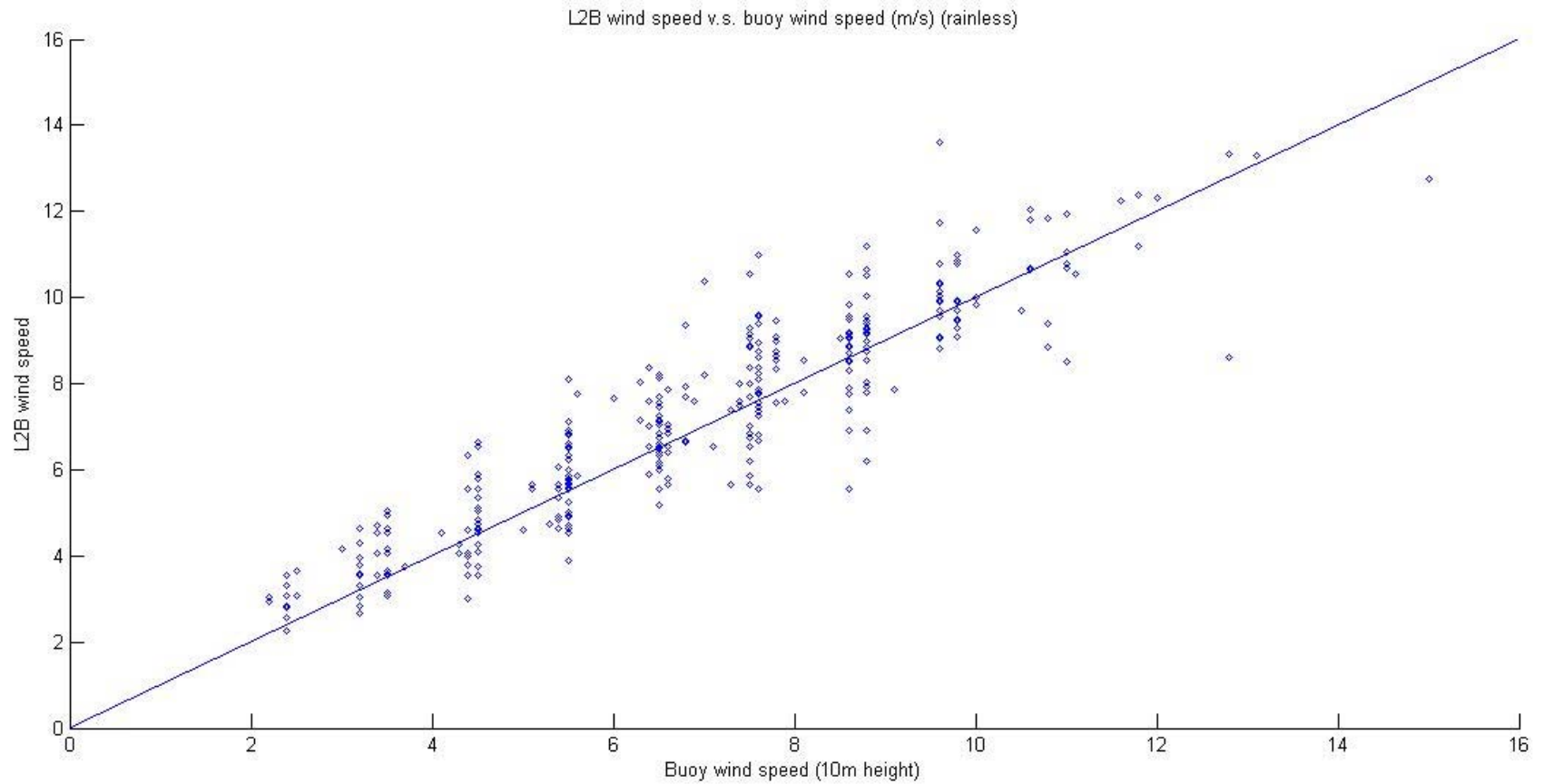


rain effect analysis

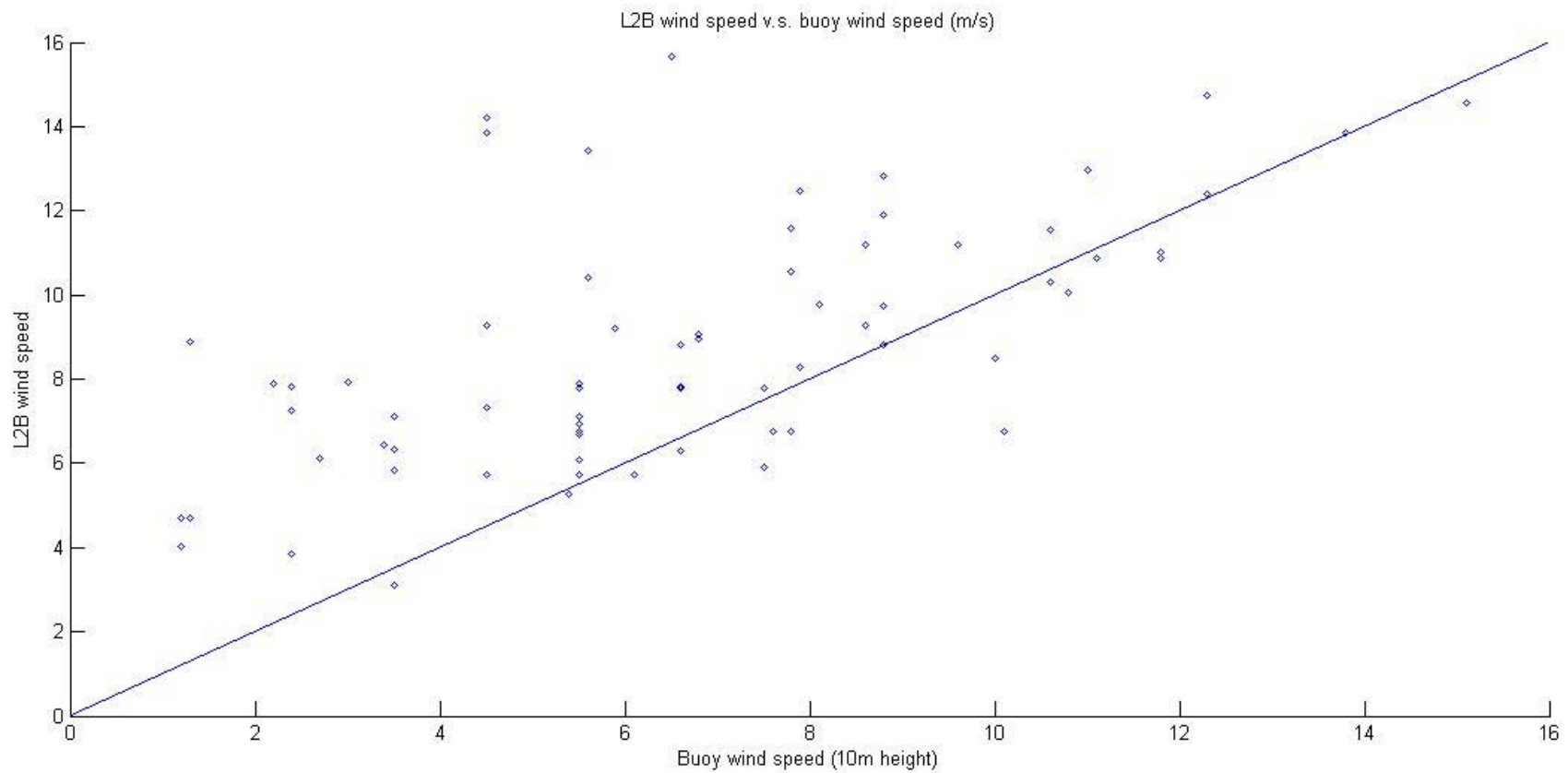
HSCAT turns out to be increasingly overestimate wind speed with GMF as rain rate increases



rain effect analysis(2015 data set)

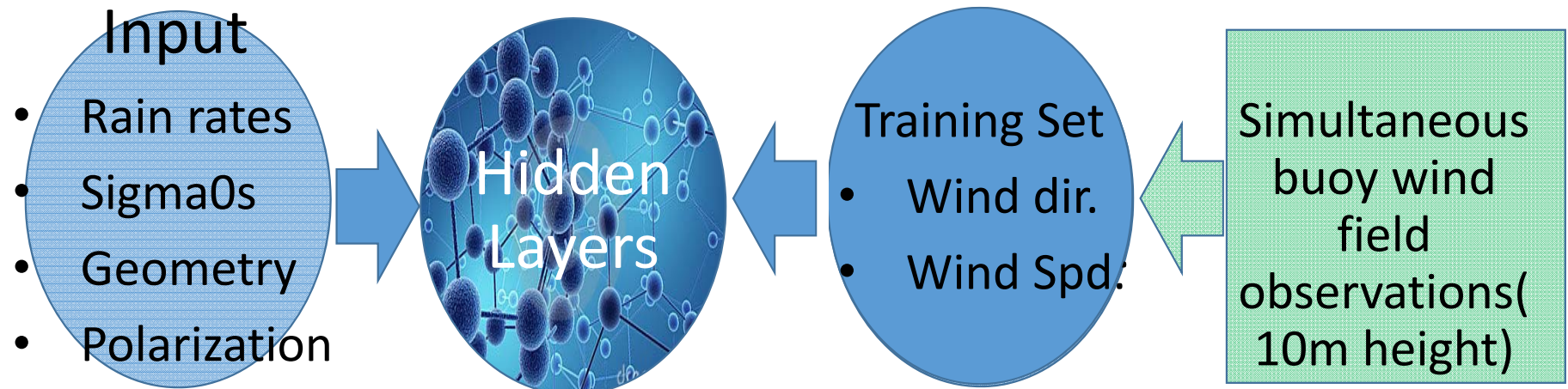


rain effect analysis (2015 data set)



Method

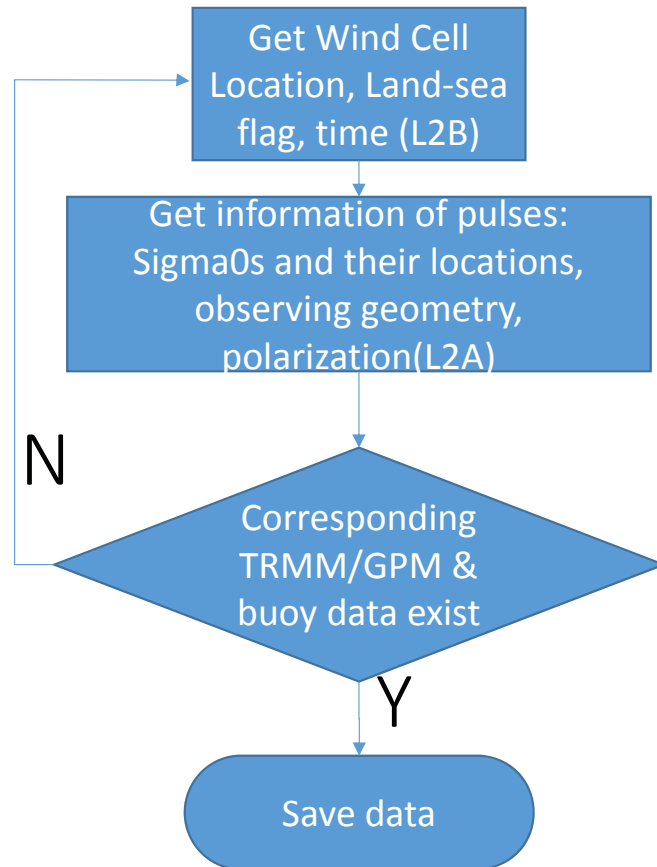
2 Training of Neural Network (2013 data set)



3 Wind field retrieval for scatterometer rainy area (2015 data set)

4 Results evaluating with reference to buoy data.

Experiments:



Training of Neural Network (h&v separately)

(2013 data set,

wind speed: 0~16m/s,

rain rate: 0.2~12mm/h)

(On average: Each wind cell has 10 pulses of half-and-half h&v)

Training data summary:

Applicable Rain rate range(mm/h)	Number
0.1~4.0	1400
4.0~8.0	200
8.0~12.0	90

Application of Neural Network

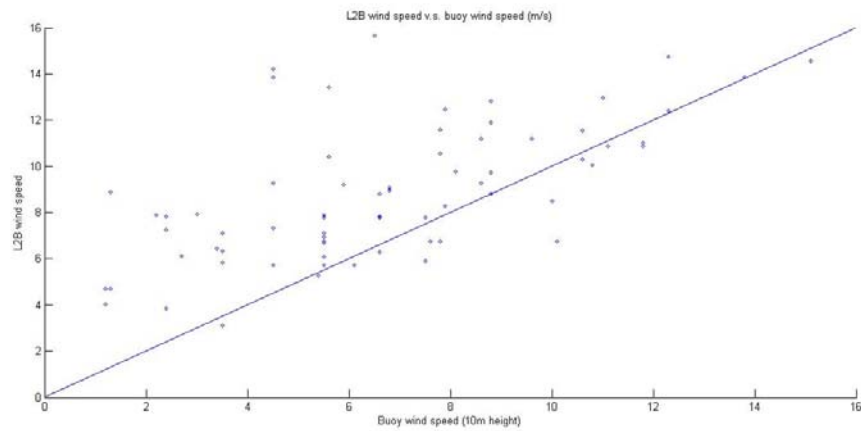
(2015 data set,

wind speed: 3~14m/s,

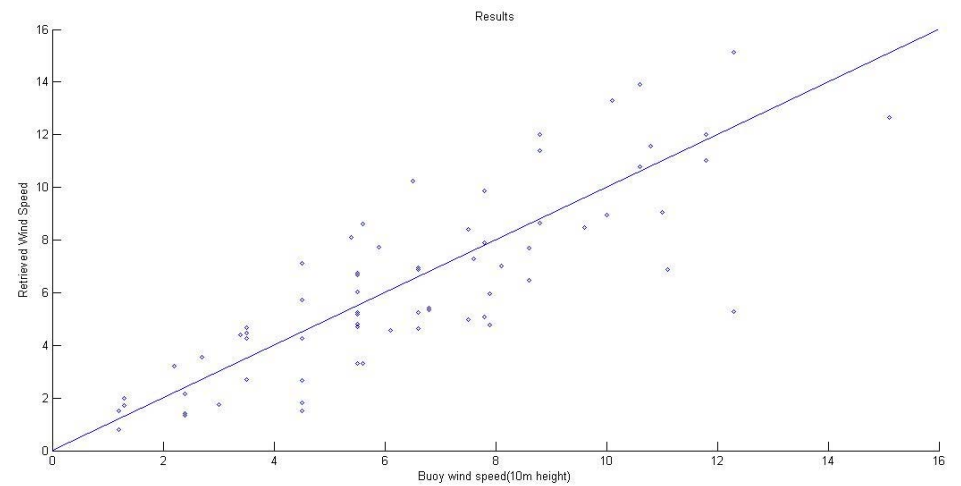
rain rate: 0.2~6mm/h

Wind cell number: 70)

Results(2015 data set)



Before correction



After ANN

Discussion: next steps

- Larger data set for networks training
- The detailed of ocean surface by rains are not considered
- Without better considering of effects from cloud particles

Other data and information needed

Thanks !