

# TIDEBED

## : TIDE DATUM RELATIONSHIP DATABASE OF KOREA

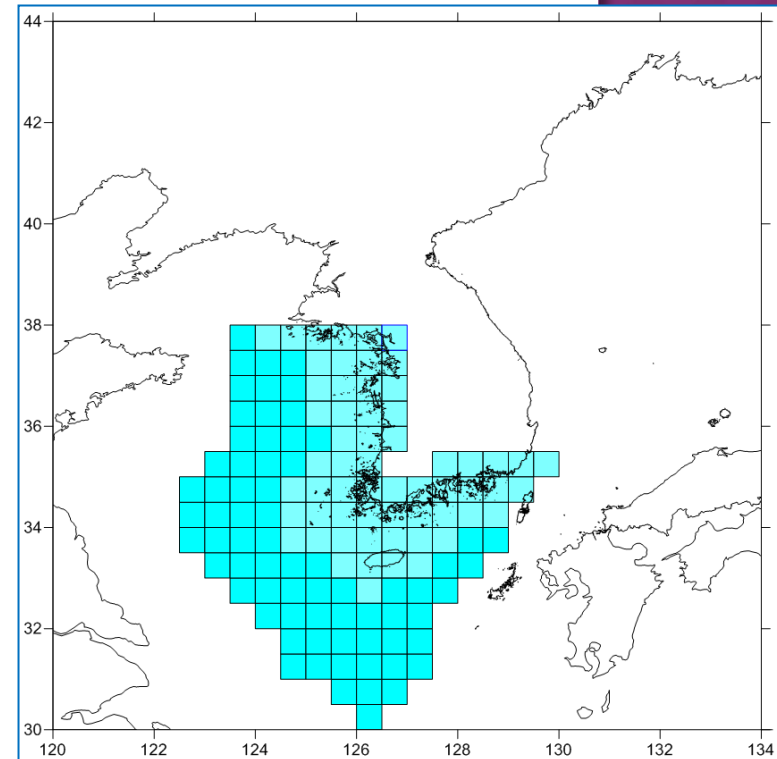
KOREA HYDROGRAPHIC AND OCEANOGRAPHIC ADMINISTRATION

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6<sup>TH</sup> TWLWG WG (2014.3.25~28)

# WHAT IS TIDEBED?

- TideBed is a database of relationships among Mean Sea Level(MSL), Datum Level(DL) and MSL at Incheon-port(IMSL) which is vertical datum of Korean geodetic datum.
- TideBed will be constructed as fine cell structure (10m mesh).
- Every cell contains
  - Separation between MSL and DL
  - Separation between MSL and IMSL
  - Harmonic constants of 4 major constituents
- Geo-spatial extends of Database
  - Inner part of Korea Exclusive Economic Zone

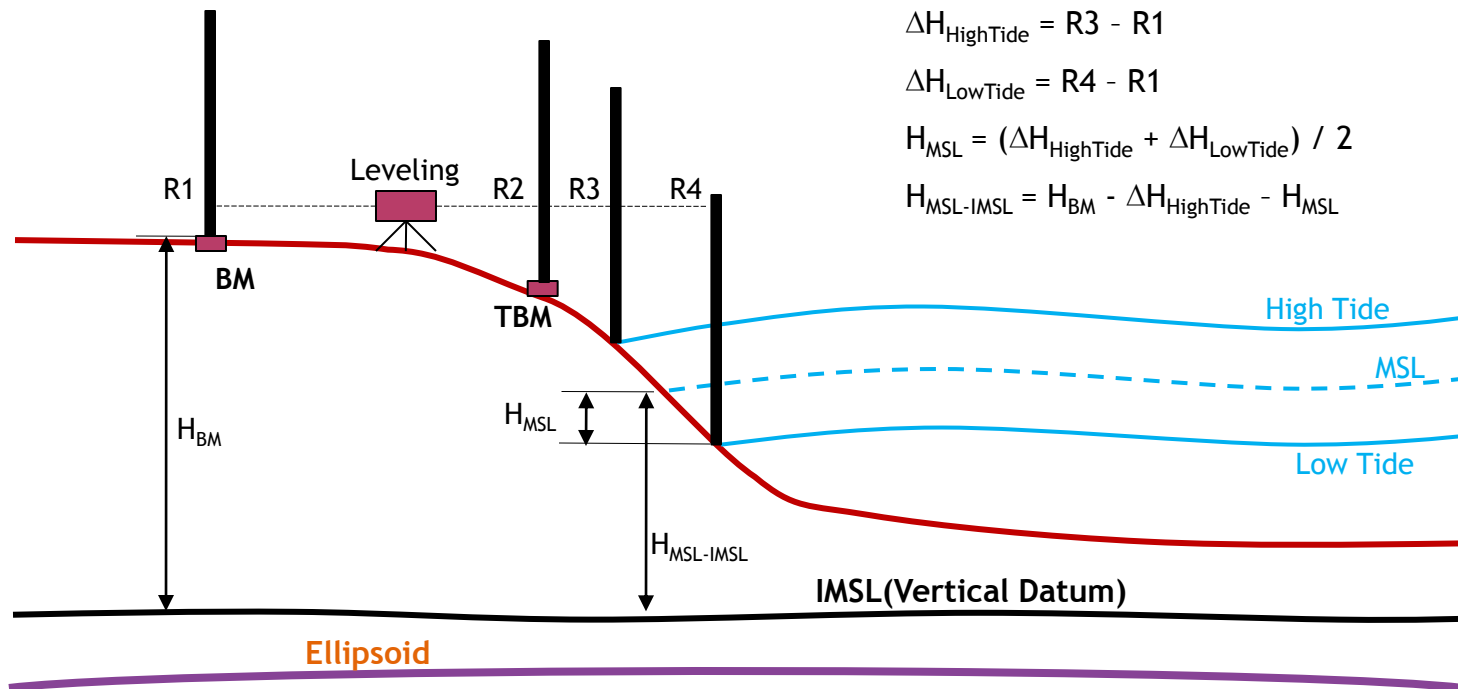


# WHY IS TIDE BED NEEDED?

- Hydrographical survey data need tide calibration
  - For consistency of calibration work, pre-programmed database of tidal corrector is needed
- Most of bathymetric survey data was compiled as Nautical Chart, but it can not reflect real topological shape and water volume.
  - Chart Datum Level = Approximation Lower Low Water
  - More shallow data are given priority in chart data selection(shoal biased)
- Correct ocean topology data is needed in various fields like as Ocean numerical modeling, coastal development, resource assessment and legal boundary delimitation.

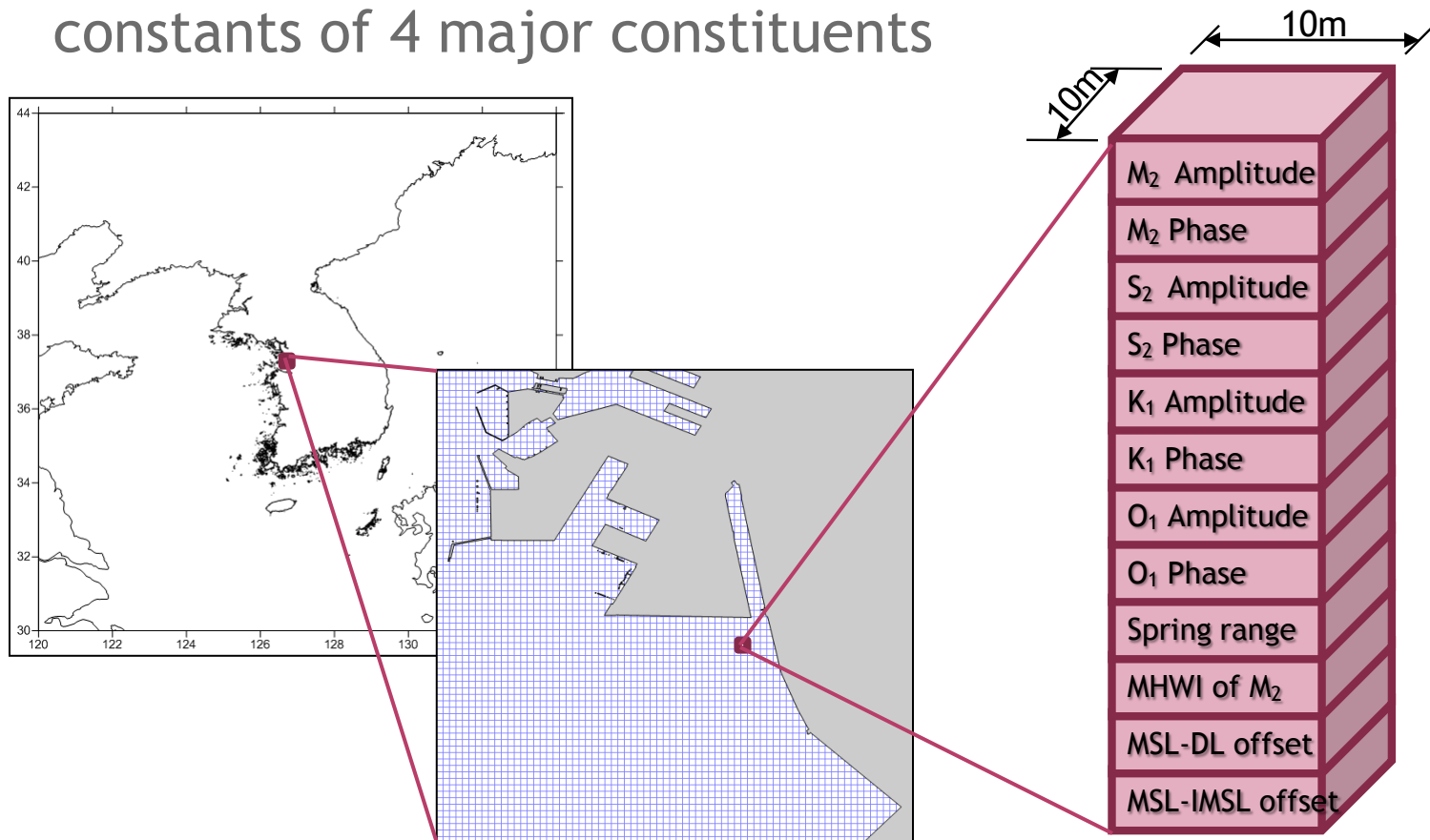
# RELATIONSHIPS AMONG THREE TIDAL DATUM

- In coastal area, the relationships among three tidal datum can be made out by
  - Leveling between land BM and Tidal BM
  - Intensive analysis on observed tide data



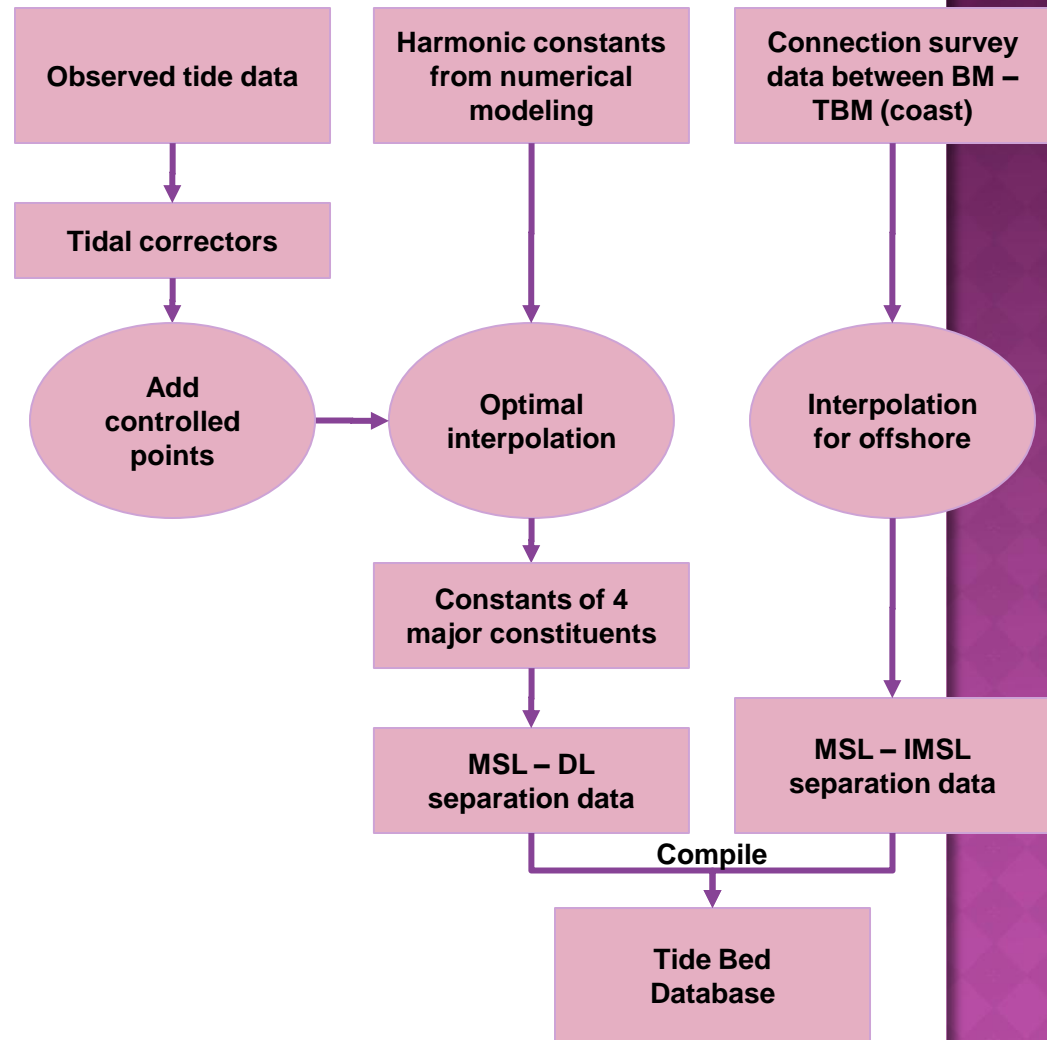
# GRID SYSTEM & CELL CONTENTS

- Tide Bed DB Grid Size :  $1/3$  arcSec  $\approx 10\text{m}$
- Each grid contains tidal corrector and harmonic constants of 4 major constituents



# DATA PROCESSING FOR DB GENERATION

- **Controlled point**
  - We use 407 points of tidal corrector data from observed data analysis, but they were not sufficient to reconstruct detail tidal characteristic of coastal area.
  - Add 1,190 controlled points as input data for more accurate distribution of tidal characteristics
- **Optimal interpolation with model data**
  - For more realistic tidal corrector distribution on outer sea, Optimal interpolation was performed.
  - NAO.99jb was used as background fields.

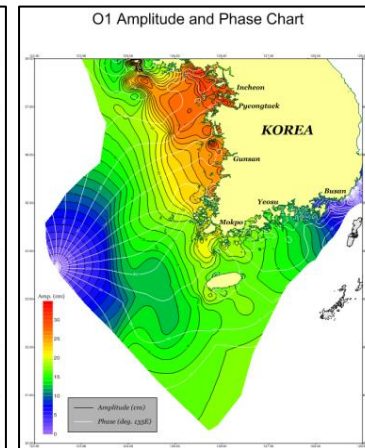
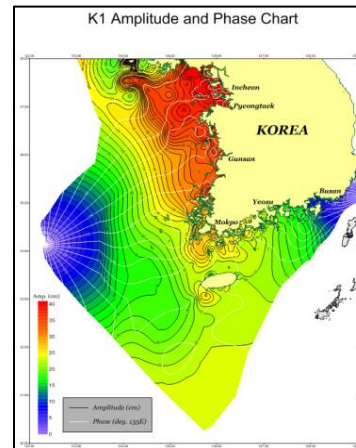
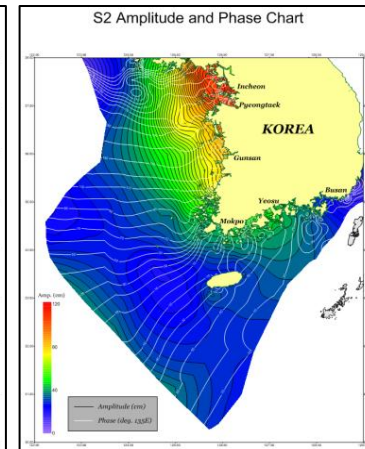
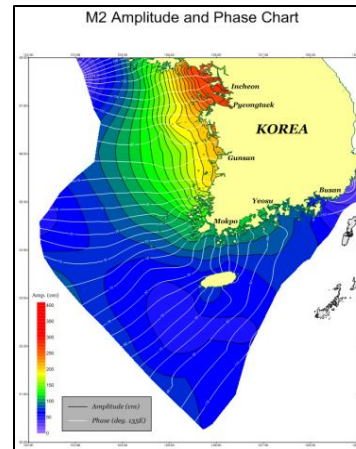
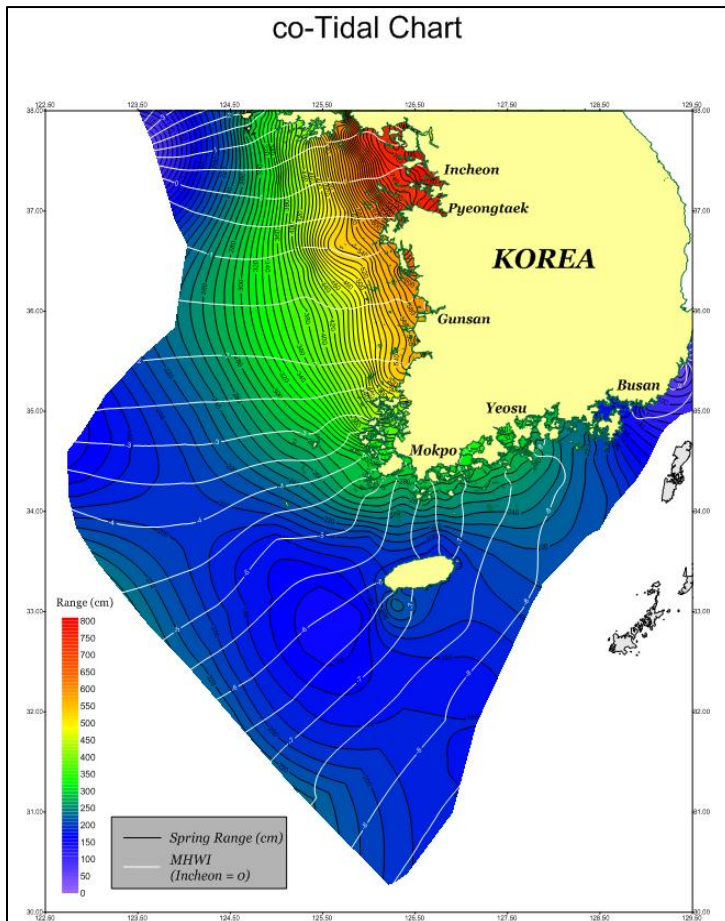


# DATA PROCESSING FOR DB GENERATION(CONT'D)

- Create separations among three tidal datum
  - Coastal area
    - MSL-DL separation calculated as sum of amplitude of 4 major tidal constituents.
    - MSL-IMSL separation estimated from results of connection survey between Land BM and Tidal BM.
  - Whole area
    - MSL-DL separation data of whole area can be made through optimal interpolation of observed(coastal) data and simulated data from numerical modeling
    - We assumed that MSL-IMSL separation of offshore would be zero, MSL-IMSL separation data made through spatial interpolation method

# ACQUIRED CHARTS

- We obtain co-tidal chart as below





# FUTURE IMPROVEMENTS

- Accuracy and uncertainty assessments
- Add new relationship between MSL and Ellipsoid
- Construct tidal harmonic constants database, consist on major 16 ~ 20 constituents
- Develop downloadable software or web-based tools for interacting with Tide Bed database

QUESTIONS?