

XBT Data Management and Quality Control in Japan (II)

Improving Database by Historical XBT System

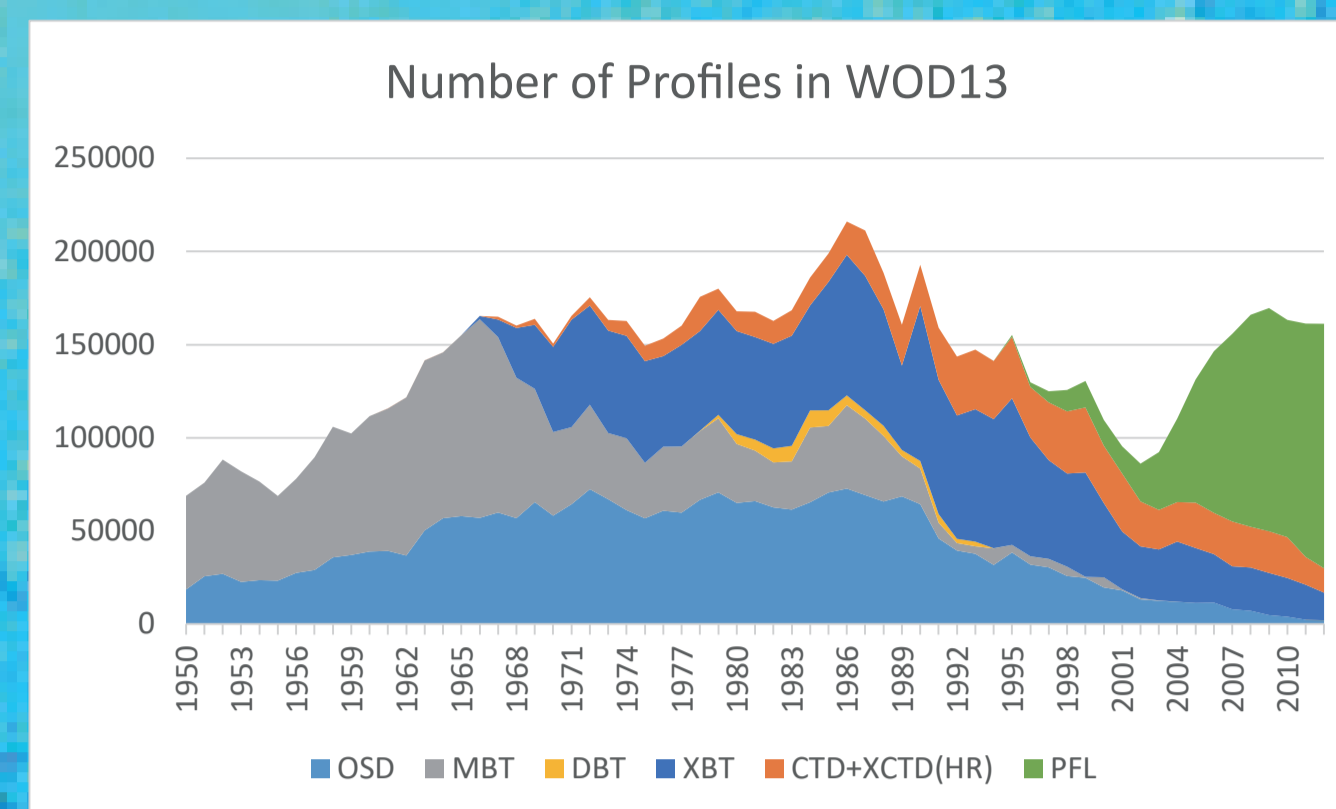
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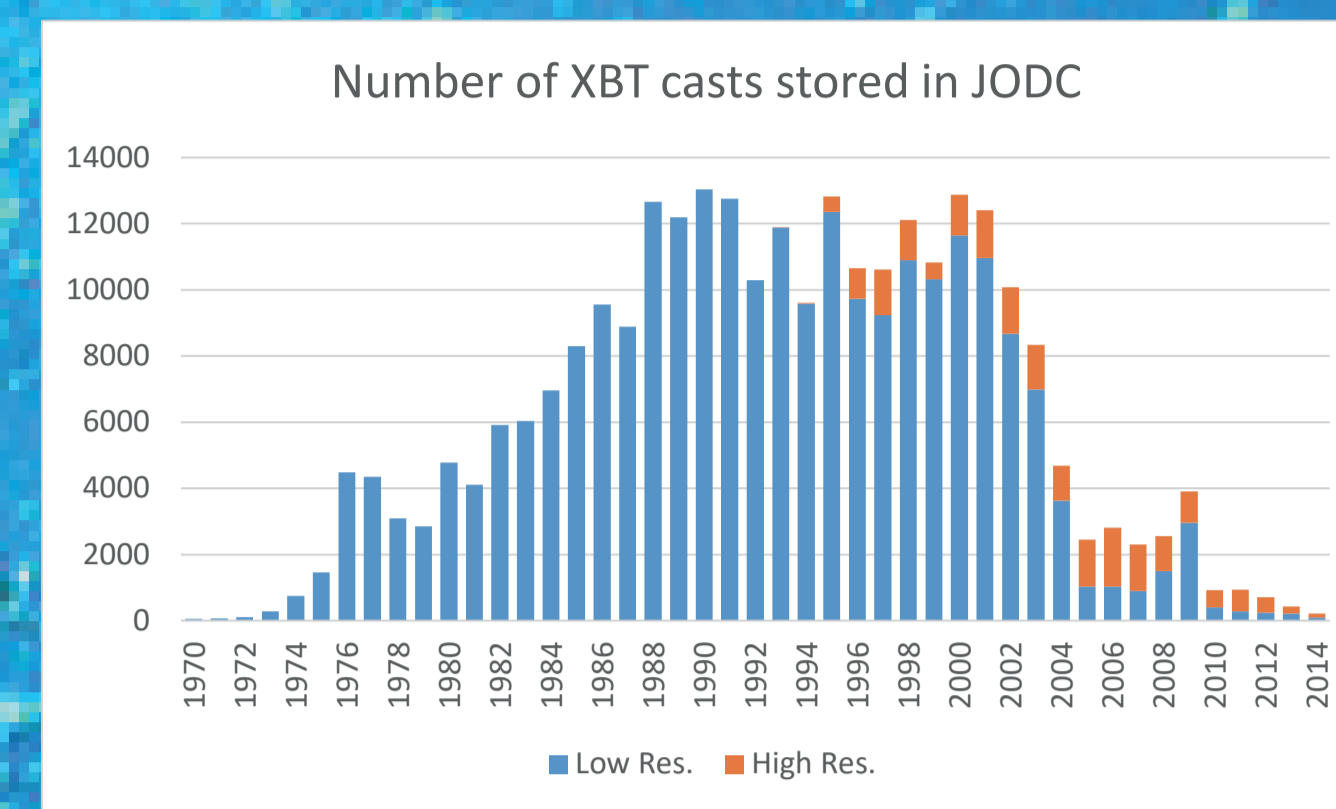
Outline

We have started to reassemble historical expendable bathythermograph (XBT) data in order to improve an ocean subsurface database in the North Pacific. In the 1980s and early 1990s, temperature observed by XBT were reported at the standard depth or inflection depth because temperature profile was recorded on strip chart (right panel of Figure 1) so that temperature and depth were digitized by visual reading. We therefore discovered and collected about 9,000 of existing XBT strip charts of T-4 probe manufactured by Tsurumi-Seiki Co. Ltd. (TSK) in Japan Meteorological Agency and Japan Hydrographic and Oceanographic Department, and traced a recorded temperature profile at a higher resolution for every chart. The traced data are approximated by a function of elapse time and temperature so that we can convert to temperature profiles using fall rate equations which are provided by XBT manufacture, Hanawa et al. (1995) or others. These temperature profiles can also compare with other instruments such as CTD or Argo floats at the same or neighborhood time and position in order to estimate their systematic errors or uncertainties. The related information such as probe type and manufacture, fall rate equation, type of recorder or converter, launch height on shipboard are also included in database as metadata. The improved database will be used to assess the climate change and the sea level rise in the North Pacific. Furthermore, we also discovered about 700 of XBT strip charts by Fujii, antarctic research vessel, in the Southern Ocean. These profiles obtained by T-5 probe by TSK, and they are not stored in Japan Oceanographic Data Center. Some traced profiles include errors such as spike or measurement failure caused by noise, broken wire, bottom grounding or others, therefore automatic and expert quality control procedures developed by International Quality-controlled Ocean Database (IQOD) project will be adopted and imported to existing database.

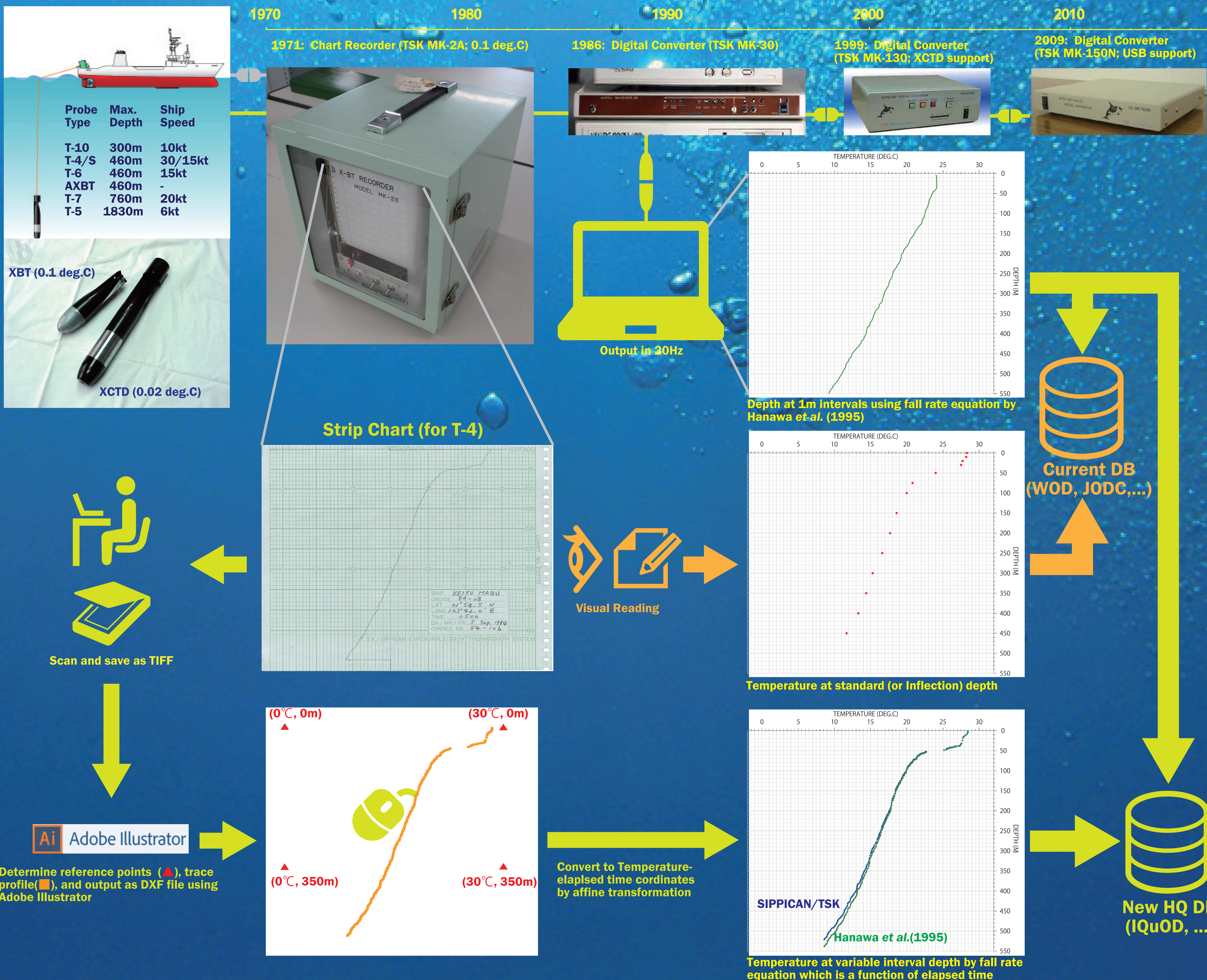
Background - current database



Total: 9,438,056 (JP: 1,171,156)
XBT: 2,211,689 (JP: 277,054)



257,444 (LR: 93%) + 19,610 (HR: 7%)



Required Metadata of XBT for Quality Control

- Manufacture ? SIPPICAN | TSK | SPARTON | unknown
- Probe type* ? T-4 | T-5 | T-6 | T-7 | T-10 | Deep Blue | Fast Deep | AXBT
- Serial/Lot number
- Launcher type ? Hand-held | Deck-Mounted | Thru-Hull | Automatic
- Launcher height from sea gauge* [meters]
- Recover/Converter/Receiver type*
- Fall Rate Equation (FRE)* ? SIPPICAN/TSK | Hanawa et al.(1995) | others
- Digitizing method and interval (if chart recorder was used)

*) with quality flag: confirmed, estimated, questionable or unknown

