R/V Mirai Surface Meteorology Data

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1. Data Set Overview:

During CINDY/DYNAMO, the R/V *Mirai* was operated by the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) in the central and eastern Indian Ocean. A large vessel able to perform observational studies over wide areas under rough weather conditions, MIRAI is one of the largest class of research vessels in the world. The *Mirai* conducted two cruise legs, with a port call in Sri Lanka between the legs.

Time period: 25 September 2011 – 1 December 2011.

Physical location: The R/V *Mirai* spent most of the time near the station location of 8°S, 80.5°E.

Data source: The surface meteorological data, upper ocean temperature, and SST were measured using the standard ship suite of instruments. SST was measured with the sea snake.

2. Instrument Description

The R/V *Mirai* is equipped with an extensive standard suite of surface meteorological and upper ocean instruments. Temperature and dew point were provided at the mast height, e.g., 21 m. Winds were adjusted to 10 m using the Kondo (1975) method. Surface pressure was measured at 13 m height.

3. Data Collection and Processing

The data were provided by Masaki Katsumata at JAMESTEC. These data were in ascii and matlab format. Brandon Kerns converted them to CF compliant NetCDF and added data attributes. No additional quality control was done.

4. Data Format

The data are in CF compliant NetCDF format. There is one file for each cruise leg – two files in total.

```
dimensions:
        time = UNLIMITED ; // (4392 currently)
variables:
        double time(time) ;
                time:units = "seconds since 1970-01-01 00:00:00.0 0:00" ;
        float td_21m(time) ;
                td_21m:long_name = "Dew point temperature at 21m" ;
                td_21m:standard_name = "dew_point_temperature" ;
                td_21m:units = "degree_Celsius" ;
        float solar_down(time) ;
                solar_down:long_name = "Downward shortwave radiation" ;
                solar_down:standard_name = "downwelling_shortwave_flux_in_air" ;
                solar_down:units = "W m-2" ;
        float rh_21m(time) ;
                rh_21m:long_name = "Relative humidity (%)" ;
                rh_21m:standard_name = "relative_humidity" ;
                rh_21m:units = "1" ;
        float lon(time) ;
                lon:long_name = "Longitude" ;
                lon:standard_name = "longitude" ;
                lon:units = "degree_east" ;
        float t_21m(time) ;
                t_21m:long_name = "Air temperature at 21m" ;
                t_21m:standard_name = "air_temperature" ;
```

```
        t_21m:units = "degree_Celsius" ;
float u10(time) ;
        u10:long_name = "Zonal wind component at 10m" ;
        u10:standard_name = "eastward_wind" ;
        u10:units = "m s-1" ;
float t_ocean(time) ;
        t_ocean:long_name = "Intake sea surface temperature" ;
        t_ocean:standard_name = "" ;
        t_ocean:units = "degree_Celsius" ;
float lat(time) ;
        lat:long_name = "Latitude" ;
        lat:standard_name = "latitude" ;
        lat:units = "degree_north" ;
float precip(time) ;
        precip:long_name = "Precipitation rate" ;
        precip:standard_name = "lwe_precipitation_rate" ;
        precip:units = "mm hr-1" ;
float qs_t_ocean(time) ;
        qs_t_ocean:long_name = "qs_t_ocean" ;
        qs_t_ocean:standard_name = "" ;
        qs_t_ocean:units = "" ;
float doy(time) ;
        doy:standard_name = "" ;
        doy:long_name = "Decimal Day of Year" ;
        doy:units = "1" ;
        doy:note = "1.0 --> 0000 UTC 01 January 2011." ;
float q_21m(time) ;
        q_21m:long_name = "Specific humidity at 21m (g/kg)" ;
        q_21m:standard_name = "specific_humidity" ;
        q_21m:units = "1" ;
float ir_down(time) ;
        ir_down:long_name = "Downward longwave radiation" ;
        ir_down:standard_name = "downwelling_longwave_flux_in_air" ;
        ir_down:units = "W m-2" ;
float v10(time) ;
        v10:long_name = "Meridional wind component at 10m" ;
        v10:standard_name = "northward_wind" ;
        v10:units = "m s-1" ;
float sst(time) ;
        sst:long_name = "Sea snake sea surface temperature" ;
        sst:standard_name = "sea_surface_temperature" ;
        sst:units = "degree_Celsius" ;
float wspd10(time) ;
        wspd10:long_name = "Wind speed" ;
        wspd10:standard_name = "wind_speed" ;
        wspd10:units = "m s-1" ;
float ssq(time) ;
        ssq:long_name = "Sea surface specific humidity (g/kg)" ;
        ssq:standard_name = "" ;
        ssq:units = "1" ;
float pressure_13m(time) ;
        pressure_13m:long_name = "Air pressure at 13m" ;
        pressure_13m:standard_name = "air_pressure" ;
        pressure_13m:units = "hPa" ;
```

5. Data Remarks

The data can be accessed using the myriad of software that is able to interact with NetCDF format files, including ncdump, ncview, Matlab, Python, IDL, and NCL.

6. References

Yokoi, Satoru, Masaki Katsumata, and Kunio Yoneyama, 2014: Variability in surface meteorology and air-sea fluxes due to cumulus convective systems observed during CINDY/DYNAMO. *J. Geophys. Res.*, **119**, 2064-2078.

Kondo, Junsei, 1975: Air-sea bulk transfer coefficients in diabatic conditions. *Boundary Layer Meteorology,* **9,** 91-112.