# Data Dictionaries for Radium Measurements

The two tables below provide the attribute label and definitions for the Radium Delayed Coincidence Counters (RaDeCC) data (isotopes Ra-223 and Ra-224) and field data files for each sampling activity (alternate field activity numbers [FANs] 22WFS05, 23WFS01, 23WFS02, 23WFS03, 23WFS04, and 24WFS01. Data are published as comma-separated values files (.csv).

Missing values are labeled as followed based on the cause: NM for not measured, and blank cells are cells indicate no flags were related to the counting procedure.

## Radium Data Dictionary Table

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| **Attribute\_Label** | **Attribute\_Definition** |
| Alt FAN ID | The alternate field activity number (altFAN: 22WFS05, 23WFS01, 23WFS02, 23WFS03, 23WFS04 or 24WFS01) followed by a dash and the SiteID field. Example: 22WFS05-NC15BW. |
| SiteID | Alphanumeric identifier containing the following: the site name (NC = Nature Coast, IRB = Indian Rocks Beach, and VH = Venice Headlands), site capture number (##) and what type of water was sampled (SW = surface water, BW = bottom water, GW = groundwater well, s = shallow, d = deep (groundwater well), and if provided a depth in meters below sea-level (MBSL) or meters below seafloor (MBSF) Example: 23WFS01-IRB35GWd. |
| Sampling Date/Time (local) | The specific date and time when the sample was taken, in MM/DD/YYYY HH:MM format. |
| Volume (L) | The volume of sample taken, in liters (L). |
| dV (L) | Uncertainty associated with volume measurement, in liters. |
| 223 Raex (dpm 100L-1) | Specific activity of radium-223, in units of disintegrations per minute per 100 L of water, in excess of its parent actinium-227 that was also extracted with the sample. |
| Δ223Raex (dpm 100L-1) | Uncertainty in specific activity for excess radium-223. |
| 223Ra (dpm 100L-1) | Specific activity of radium-223, in units of disintegrations per minute per 100 L of water. |
| Δ223Ra (dpm 100L-1) | Uncertainty in specific activity for total radium-223. |
| 224Raex (dpm 100L-1) | Specific activity of radium-224, in units of disintegrations per minute 100 L of water, in excess of its parent thorium-228 that was also extracted with the sample. |
| Δ224Raex (dpm 100L-1) | Uncertainty in specific activity for excess radium-224. |
| 224Ra (dpm 100L-1) | Specific activity of radium-224, in units of disintegrations per minute per 100 L of water. |
| Δ224RaTot (dpm 100L-1) | Uncertainty in total specific activity of total radium-224. |
| Ra\_1stCnt Errors | Data reduction QA flag as described by Diego-Feliu and others (2020) for total activity of Radium-223 and/or Radium-224 for Run 1. Blanks indicate no QA flag was issued. |
| 223Ra-ssLc Run 1 (dpm 100L-1) | Single sample critical limit of radium-223, measured in units of disintegrations per minute per 100 L of water during run 1 (total activity). |
| 223Ra-ssMDC Run 1 (dpm 100L-1) | Minimum detectable activity of radium-223, measured in units of disintegrations per minute per 100 L of water during run 1 (total activity). |
| 224Ra-ssLc Run 1 (dpm 100L-1) | Single sample critical limit of radium-224, measured in units of disintegrations per minute per 100 L of water during run 1 (total activity). |
| 224Ra-ssMDC Run 1 (dpm 100L-1) | Minimum detectable activity of radium-224, measured in units of disintegrations per minute per 100 L of water during run 1 (total activity). |
| Ra\_2ndCnt Errors | Data reduction QA flag as described by Diego-Feliu and others (2020) for total activity of Radium-223 and/or Radium-224 for Run 2. Blanks indicate no QA flag was issued. |
| 223Ra-ssLc Run 2 (dpm 100L-1) | Single sample critical limit of radium-223, measured in units of disintegrations per minute per 100 L of water during run 2 (supported activity). |
| 223Ra-ssMDC Run2 (dpm 100L-1) | Minimum detectable activity of radium-223, measured in units of disintegrations per minute per 100 L of water during run 2 (supported activity). |
| 224Ra-ssLc Run 2 (dpm 100L-1) | Single sample critical limit of radium-224, measured in units of disintegrations per minute per 100 L of water during run 2 (supported activity). |
| 224Ra-ssMDC Run 2(dpm 100L-1) | Minimum detectable activity of radium-224, measured in units of disintegrations per minute per 100 L of water during run 2 (supported activity). |

## Field Data Dictionary Table

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| **Attribute\_Label** | **Attribute\_Definition** |
| USGS Field Activity Number (FAN) | Designated alphanumeric identifier for the field activity number (FAN). The field activity number format is YYYY-###-FA, where YYYY is the year that the activity was started and ### is a sequential number (starting at 300, for USGS SPCMSC field activities), and FA is an abbreviation for field activity. |
| Site ID | Alphanumeric identifier containing the following: altFAN (22WFS05, 23WFS01, 23WFS02, 23WFS03, 23WFS04 or 24WFS01), followed by a dash and the site name (NC = Nature Coast, IRB = Indian Rocks Beach, and VH = Venice Headlands), site capture number (##) and what type of water was sampled (SW = surface water, BW = bottom water, GW = groundwater well, s = shallow, d = deep (groundwater well), and if provided, a depth in meters below sea-level (MBSL) or meters below seafloor (MBSF) Example: 23WFS01-IRB35GWd. |
| Sampling Date/Time (local) | The specific date and time when the radium sample was taken, in MM/DD/YYYY HH:MM format. |
| Longitude (DD) | Longitude (in decimal degrees) where sample was collected, in the World Geodetic System of 1984 (WGS 84) coordinate system. |
| Latitude (DD) | Latitude (in decimal degrees) where sample was collected, in the World Geodetic System of 1984 (WGS 84) coordinate system. |
| Water Depth (m) | Depth in meters (m) at which sample was collected. |
| Temperature (°C) | Measure of temperature of the water column, in degrees Celsius (°C). |
| Barometric Pressure (mmHg) | Atmospheric pressure, in millimeters of mercury (mmHg). |
| Dissolved Oxygen (DO) (%) | Percent of oxygen dissolved in the water. |
| DO (mg/L) | Amount of oxygen dissolved in the water, in milligrams per liter (mg/L). |
| Specific Conductance (mS/cm) | Ability of the water to conduct an electrical current, measured in millisiemens per centimeter (mS/cm). Used to calculate salinity. |
| Salinity | Salt content of the water in practical salinity units (psu). |
| pH | Measurement of the acidity or alkalinity (pH) of the water. |
| pH (mV) | Measurement of the acidity or alkalinity (pH) of the water, in millivolts (mV). |
| ORP (mV) | Measurement of the oxidation reduction potential, in millivolts (mV). |

Diego-Feliu, M., Rodellas, V., Alorda-Kleinglass, A., Tamborski, J., van Beek, P., Heins, L., Bruach, M., Arnold, R., and Garcia-Orellana, J., 2020, Guidelines and Limits for the Quantification of Ra Isotopes and Related Radionuclides With the Radium Delayed Coincidence Counter (RaDeCC): Journal of Geophysical Research: Oceans, v. 125, no. 4, <https://doi.org/10.1029/2019JC015544>.