**Table S1.** Error estimates used in state-space model *crawl* (Johnson et al., 2008) for movement data for Magellanic penguins tracked from ten colonies in Argentina.

|  |  |  |
| --- | --- | --- |
| Model | Error estimates | Manufacturer |
| Argos PTTs |  |  |
| ST10 | \*LC 3: log(250) m;  LC 2: log(500) m;  LC 1: log(1000) m;  LC 0, A, B: estimated by model;  LC Z: not used | Telonics+ |
| ST20 (before 2015) | Same as ST10 | Telonics+ |
| ST20 (2015) | Argos error ellipse\*\* | Telonics+ |
| SPOT-275C | Argos error ellipse\*\* | Wildlife Computers |
| GPS tags |  |  |
| F2G 134A | log(20) m | PathTrack++ |
| F5G 334A/434A | 7 or 8 satellites: log(20) m;  6 satellites: log(35) m;  4 or 5 satellites: estimated by model;  < 4 satellites: not used | SirTrack |
| nanoFix-GEO | log(20) m | PathTrack |

\* Argos location class. LC Z not used because Argos does not provide an error estimate.

\*\* Locations without error ellipse data were not used.

+ Custom packaged by Sirtrack.

++ Supplied by Sirtrack.

Telonics, Inc. (Mesa, AZ, USA), Wildlife Computers (Redmond, WA, USA), Sirtrack (now Lotek; Havelock North, New Zealand), PathTrack Ltd. (Otley, UK).