Reading biological parameters from stranded specimens and skeletal remains of Adriatic bottlenose dolphins (*Tursiops truncatus*)

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Intorduction

- complete or partial skeleton is often the only remain to be examined in a whale
- these remains can contribute to the knowledge on important biological data such as species, age, sex, body length and body mass
- bottlenose dolphin has a worldwide distribution and diverse morphotypes, so morphological studies on local populations are highly encouraged
- our intention was to determinate external body and osteological measurements which correlate well with body length and body mass

Material and methode

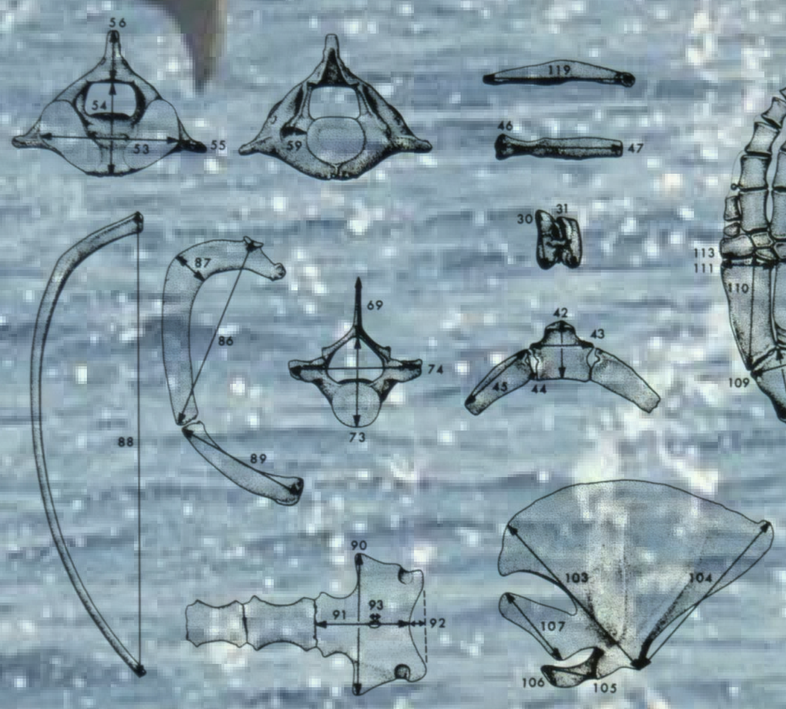
- we analyzed morphometrical values of 83 bottlenose dolphins (*Tursiops truncatus*) found dead in the period from October 1990 till December 2004 in the Croatian part of the Adriatic Sea
- post-mortem examinations included determination of body mass, 22 external body measurements and 153 skeletal measurements and meristic characters

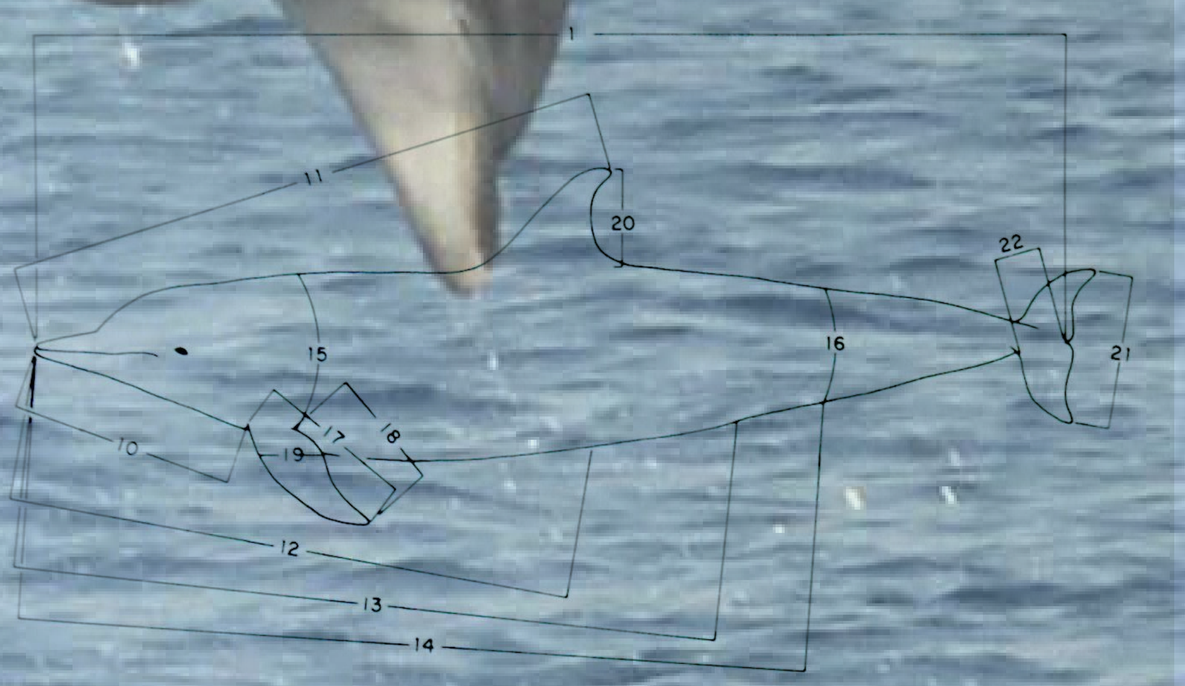
Table 1: Formula for total body length estimation (in cm). x represents the body measurement (in cm)

Body measurement (number in figure)	Correlation factor (r^2)	Formula for total body length estimation
Greatest width of first lumbar vertebra	0.9044	total body length = 88.9+7.15*x
Length of 23rd centrum, exclusive epiphyses	0.9355	total body length = 102.4+57.85*x
Greatest length of first left vertebral rib (86.)	0.9063	total body length = 34.5+13.64*x
Greatest length of longest left vertebral rib (88.)	0.9500	total body length = 37.3+6.12*x
Greatest width of manubrium (90.)	0.9019	total body length = 79.9+16.31*x
Greatest total height of largest chevron bone	0.9298	total body length. = 102.8+24.67*x
Height of scapula (103.)	0.9584	total body length = 70.6+11.06*x
Length of scapula (104.)	0.9518	total body length = 105.7+10.77*x
Greatest ventral length of humerus (108.)	0.9120	total body length. = 18.1+31.1*x
Greatest width of humerus distally (109.)	0.9251	total body length. = -9.5+50.89*x
Greatest width of radius distally (111.)	0.9122	total body length = 3.3+51.49*x
Transverse breadth of proximal row of carpals (113.)	0.9043	total body length = 56.5+24.43*x

Table 2: Formula for body mass estimation (in kg). x represents the body measurement value (in cm)

Body measurement (number in figure)	Correlation factor (r^2)	Formula for body mass estimation
Total body length (1.)	0.8493	body mass = -161.5+1.35*x
Length from tip of upper jaw to tip of dorsal fin (11.)	0.8717	body mass = -208.9+2.48*x
Length from tip of upper jaw to midpoint of umbilicus (12.)	0.8301	body mass = -171.6+3.0*x
Length from tip of upper jaw to midpoint of genital aperture (13.)	0.8030	body mass = -165.9+2.08*x
Length from tip of upper jaw to center of anus (14.)	0.8380	body mass = -166.5+1.94*x
Girth on a transverse plane intersecting the anus (16.)	0.9017	body mass = -195.1+4.92*x
Length of flipper from anterior insertion to tip (17.)	0.8591	body mass = -169.4+9.04*x
Length of flipper from axilla to tip (18.)	0.8543	body mass = -142.6+11.81*x
Greatest width of flipper (19.)	0.8282	body mass = -132.2+21.36*x
Span of flukes from tip to tip (21.)	0.8449	body mass = -110.5+4.91*x
Width of fluke from nearest point on anterior border of flukes to notch (22.)	0.8201	body mass = -188.2+21.59*x
Greatest width of left thyrohyal proximally (46.)	0.8003	body mass = -75.5+101.79*x
Length of neural spine of first thoracic vertebra (69.)	0.8046	body mass = -9.8+48.12*x
Greatest width of radius distally (111.)	0.8003	body mass = -178.1+73.486*x





Results

Total body length (Table 1)

- 12 osteological measurement correlate well (correlation factor r^2>0.9) with the total body length
- postcranial measurements show better correlations to the total body length when compared to the cranial skeleton

Body mass (Table 2)

- the correlation between body mass and external body and osteological measurements is lower (correlation factor r^2>0.8) then in the case of the total body length.
- body mass is most accurately estimated with girth measurements while the thyrohyal and radius are the best bones for body mass estimations when an incomplete skeleton is found