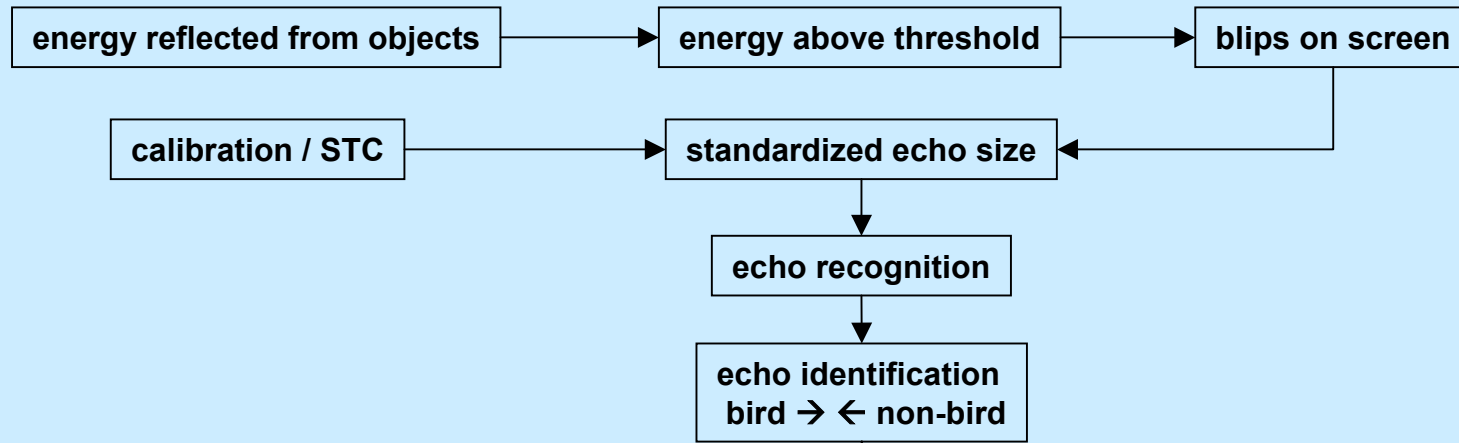


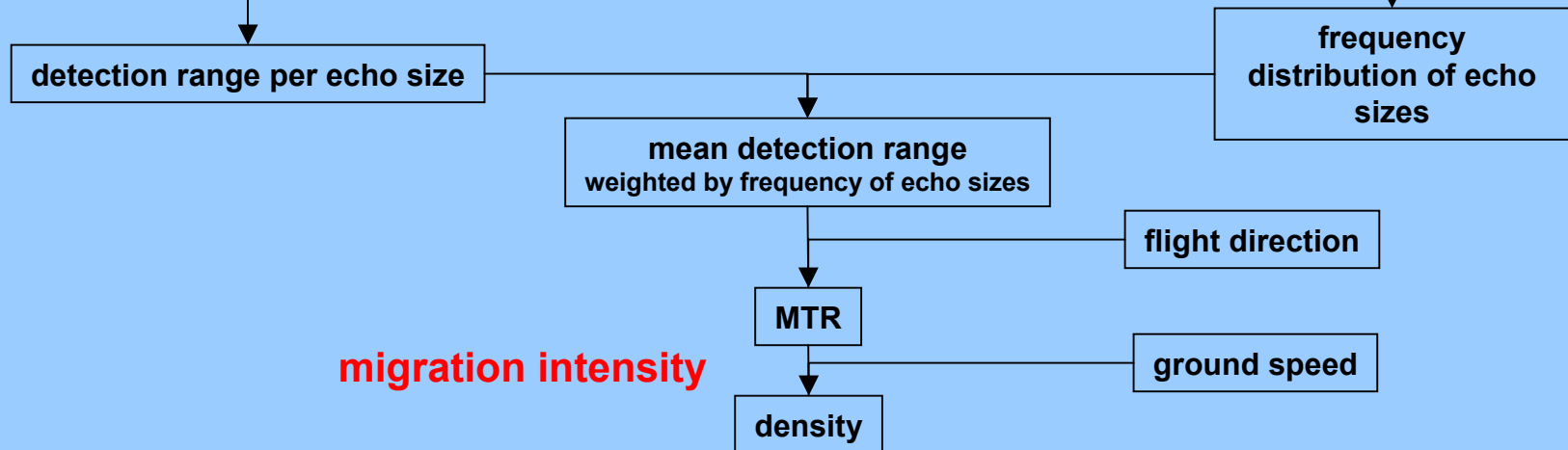


From blibs to bird quantification

echo detection



quantification





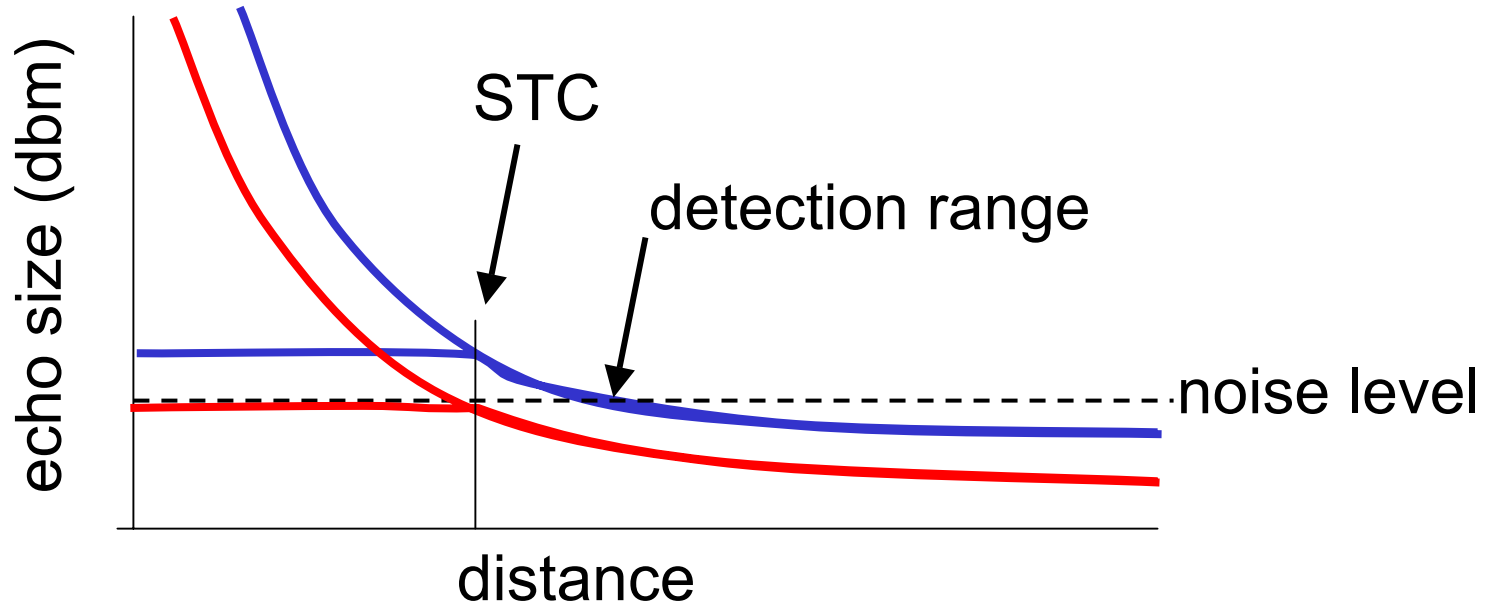
Clutter picture





Calibration and STC

calibration of the echo size → signal generator





Echo recognition

FixBeam (Version 16.02.2006)
File Echos Tools View Zoom Options

General: Radar-Site: Date: Time: Threshold: Offset: VSU:

Antenna position: Elevation (CMD): Elevation Start: Elevation Stop: Elevation Offset: Azimuth (CMD): Azimuth Start: Azimuth Stop:

STC/Threshold-Control: Synthetic: Offset: Absolute: STC:

Echos detected with: STC: Threshold:

Mouse-Control: Zoomfactor: Scan Nr.: Scantime (s): Distance Cell: Distance (m): Altitude (m):

Level-Control:

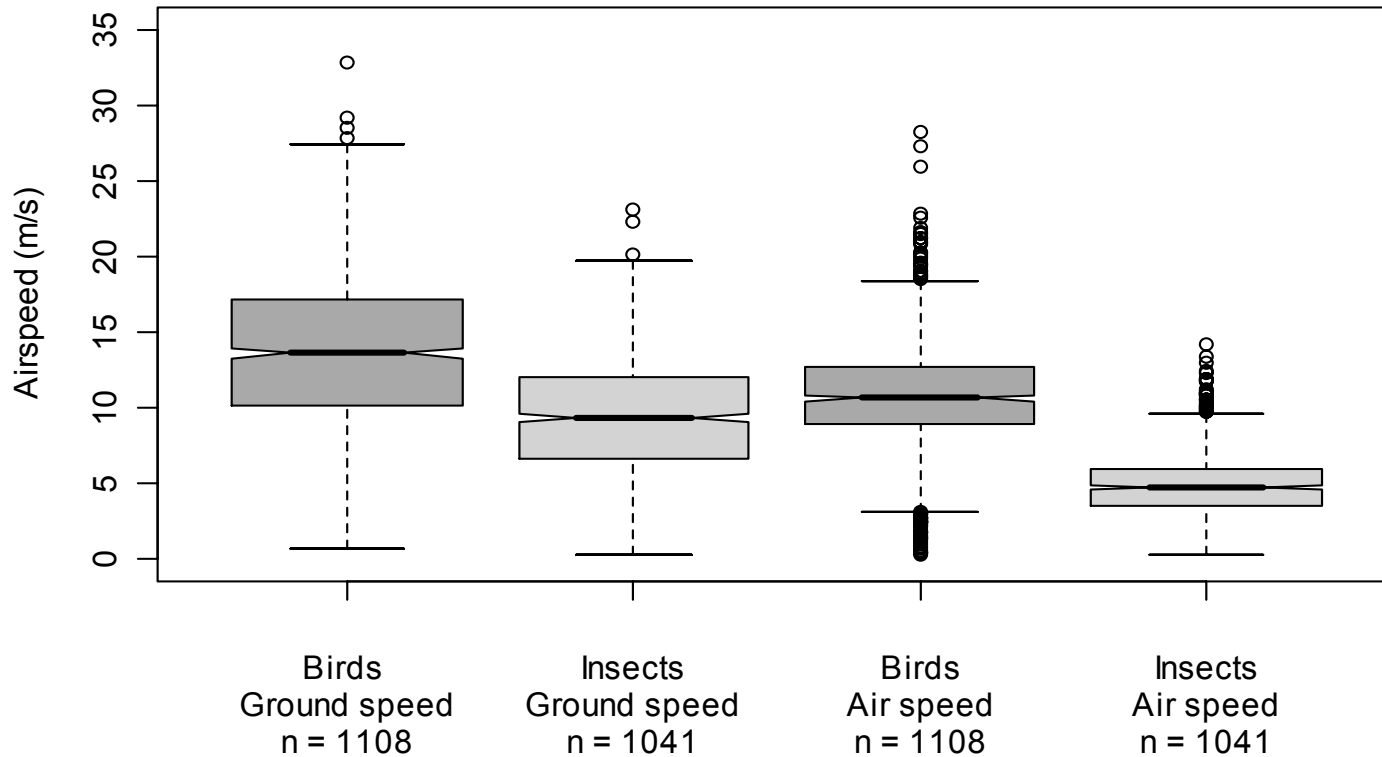
Data files: S-060513-1910.FF2 S-060513-1915.FF2 S-060513-2000.FF2 S-060513-2005.FF2 S-060513-2010.FF2 S-060513-2015.FF2 S-060513-2100.FF2 S-060513-2105.FF2 **S-060513-2110.FF2** S-060513-2115.FF2

1 / 0.0 Start (Scans/Sec) Detect echos Stop (Scans/Sec) 32000 / 245.8

Length (sec): Level diff: Points FFT: Frequency:

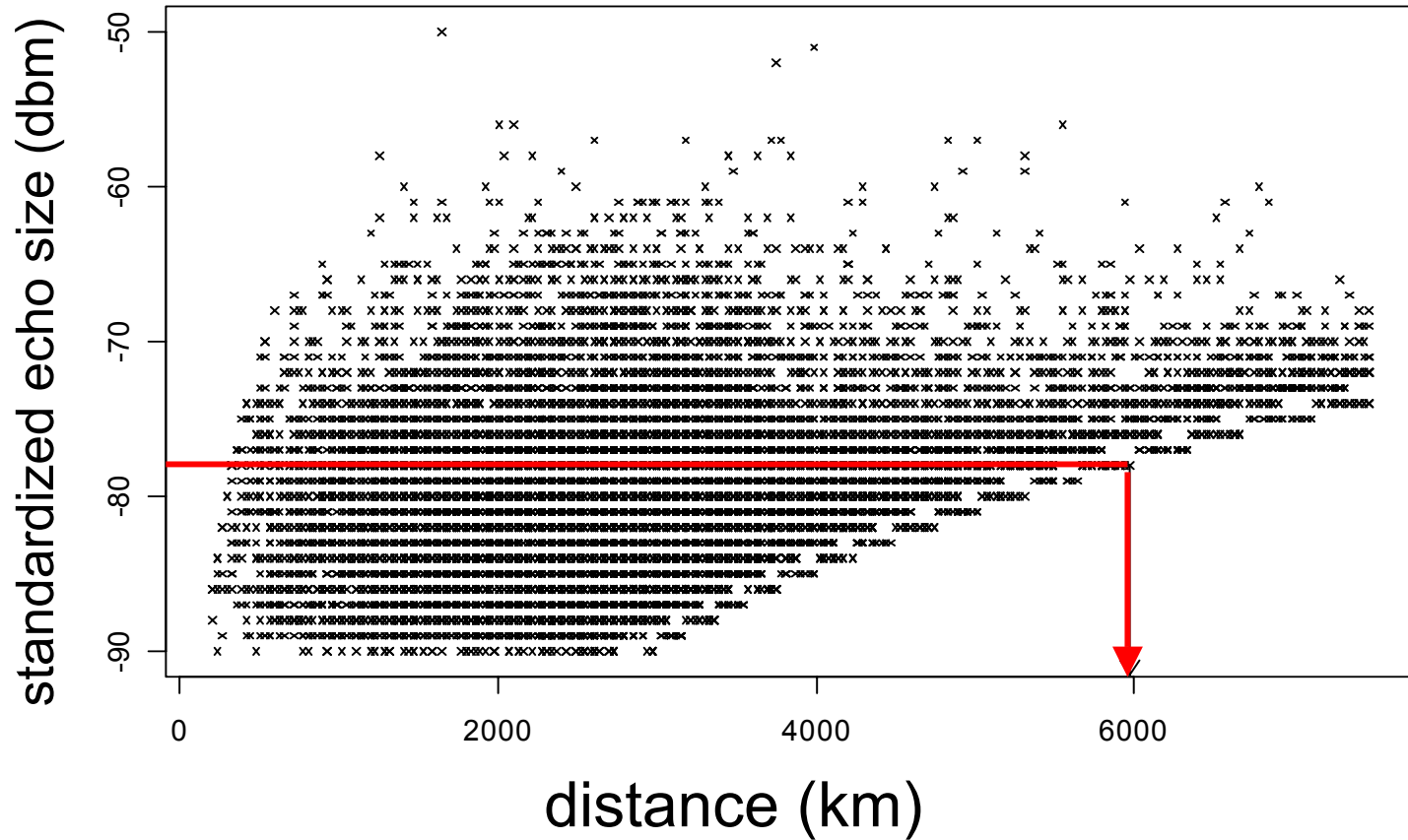


Discriminating birds from insects





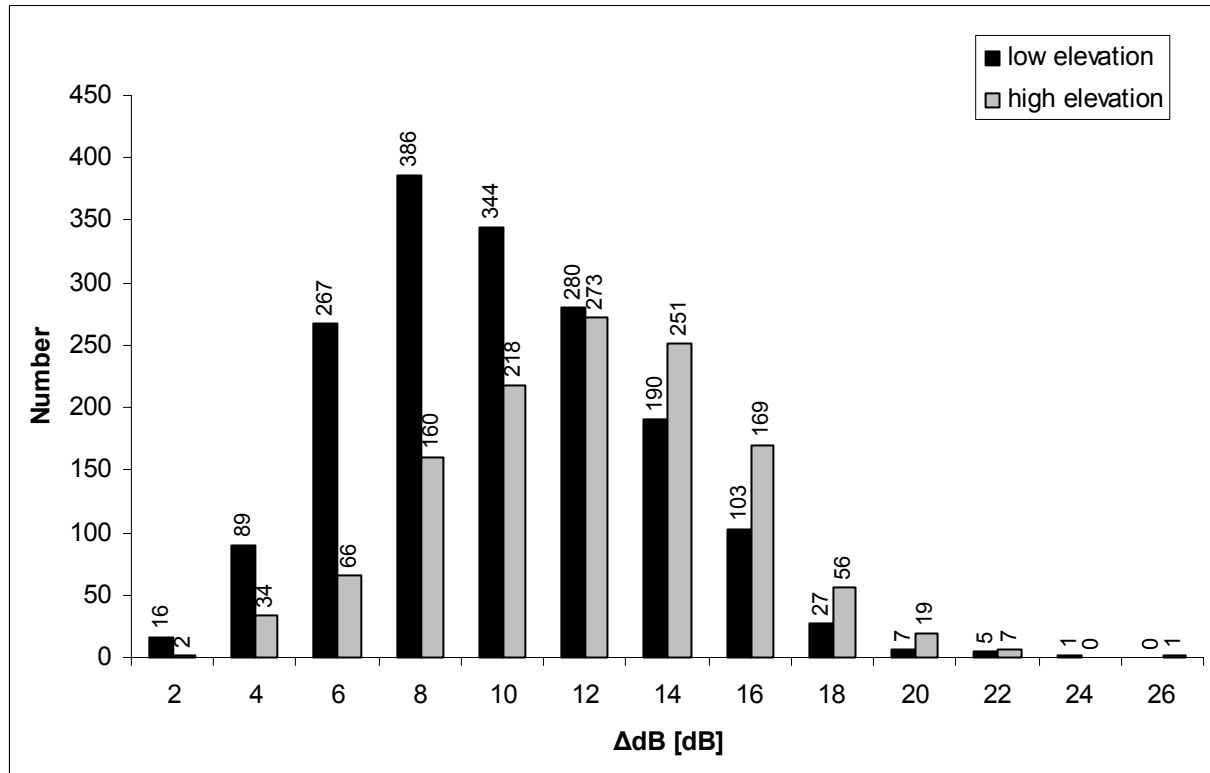
Detection range per echo size





Distribution of echo sizes

passerines

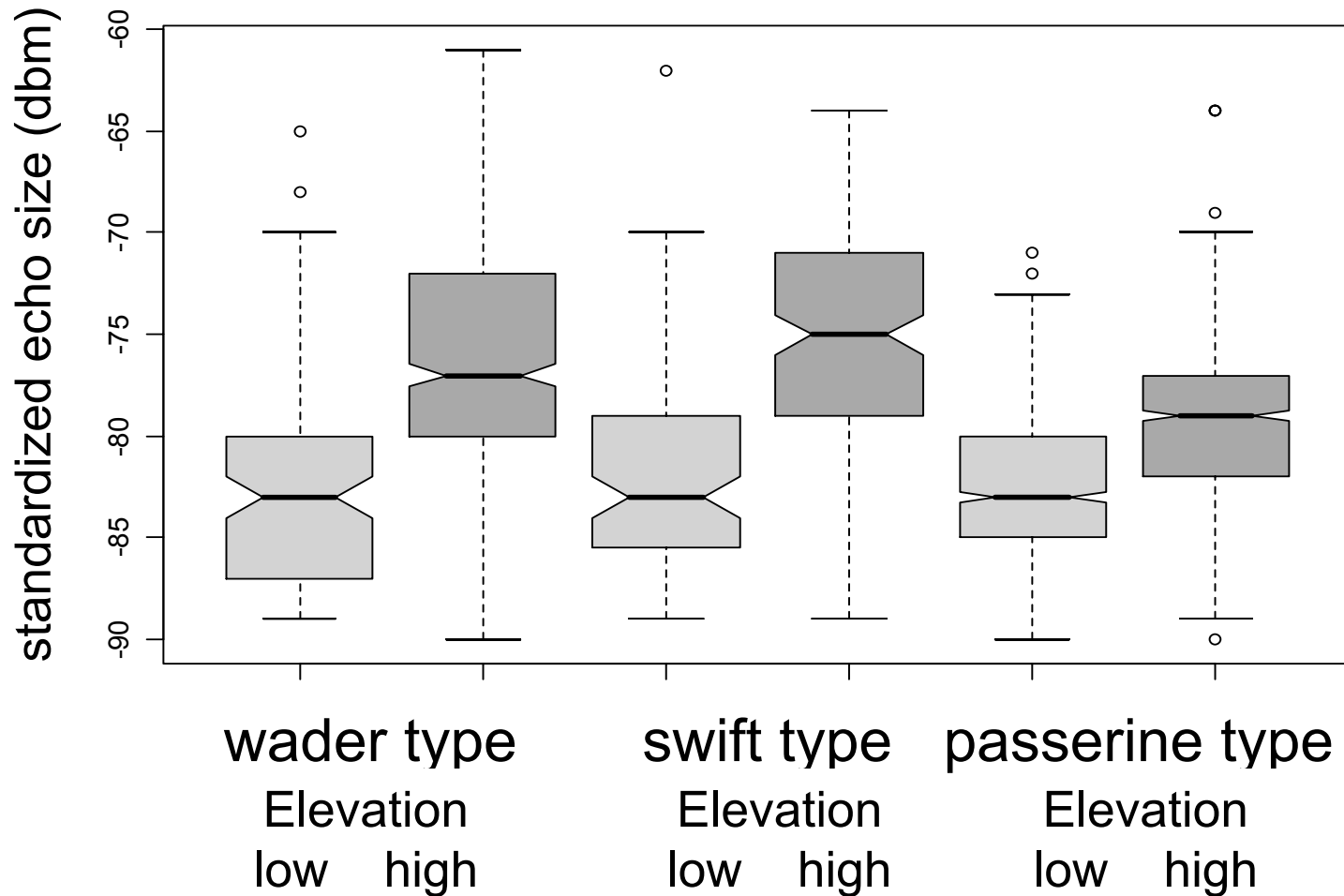


standardized echo size (dbm)



Echo size

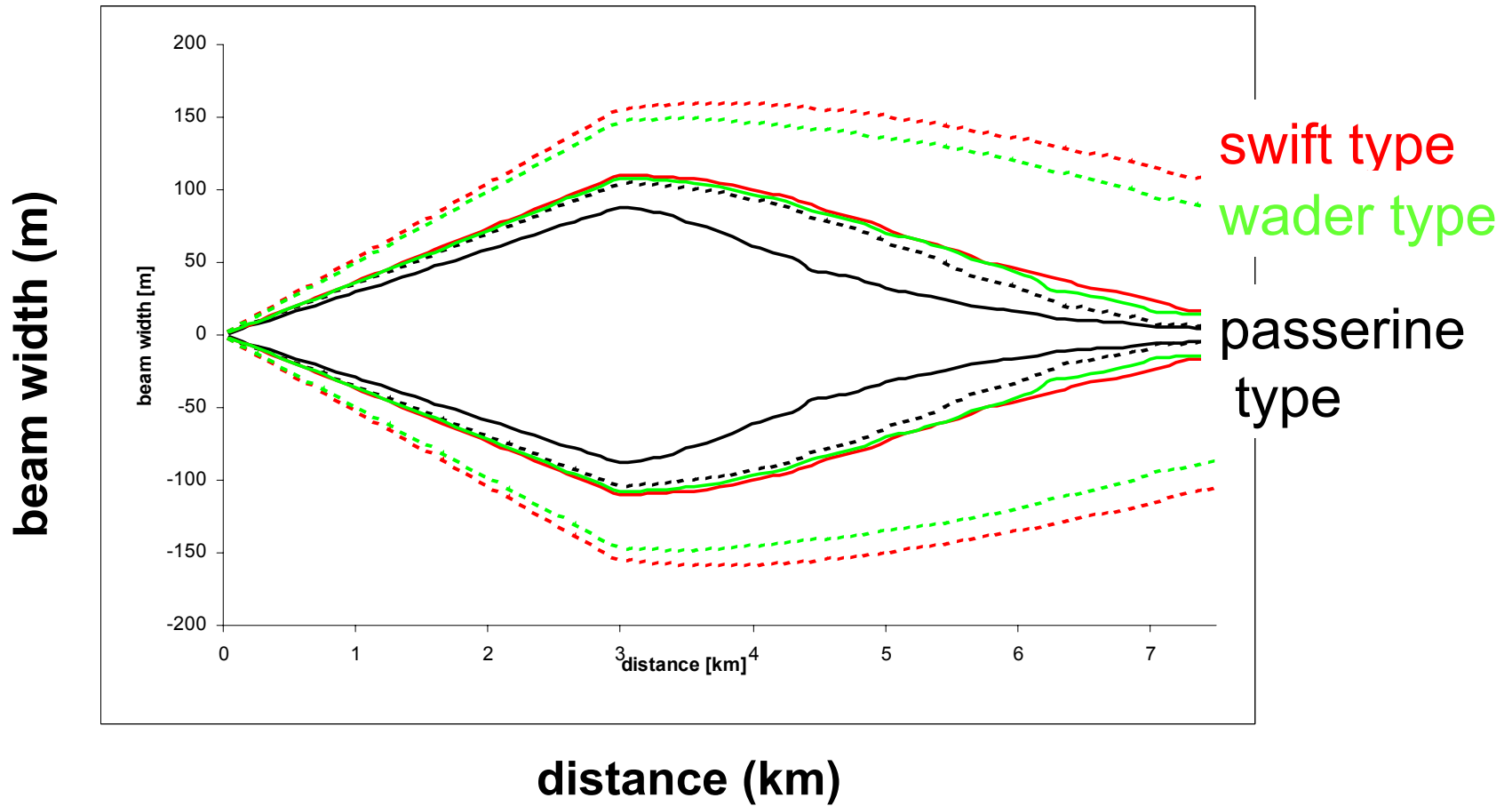
standardized echo sizes – the influence of the aspect





Detection range

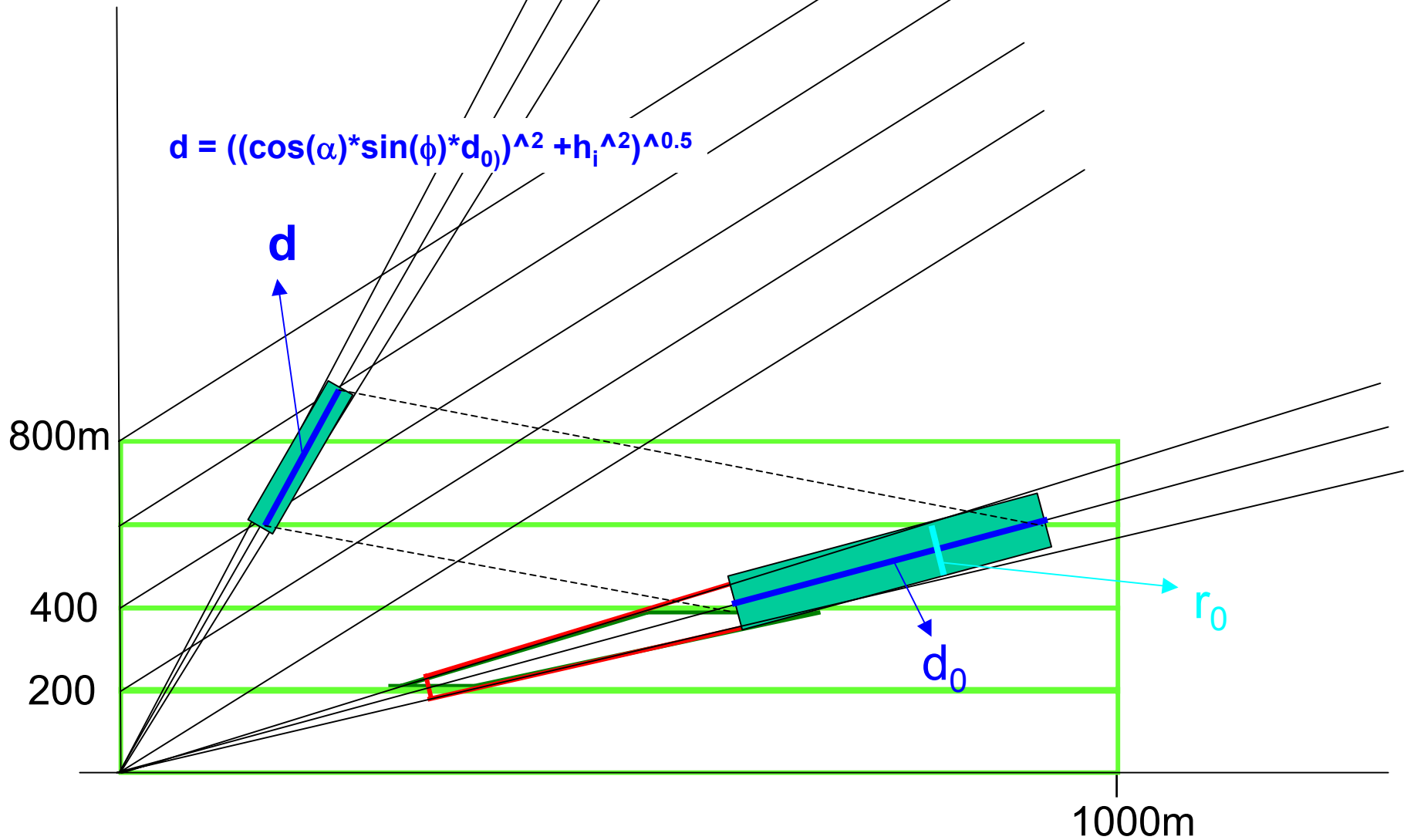
mean detection range per echo class





Surveyed volume

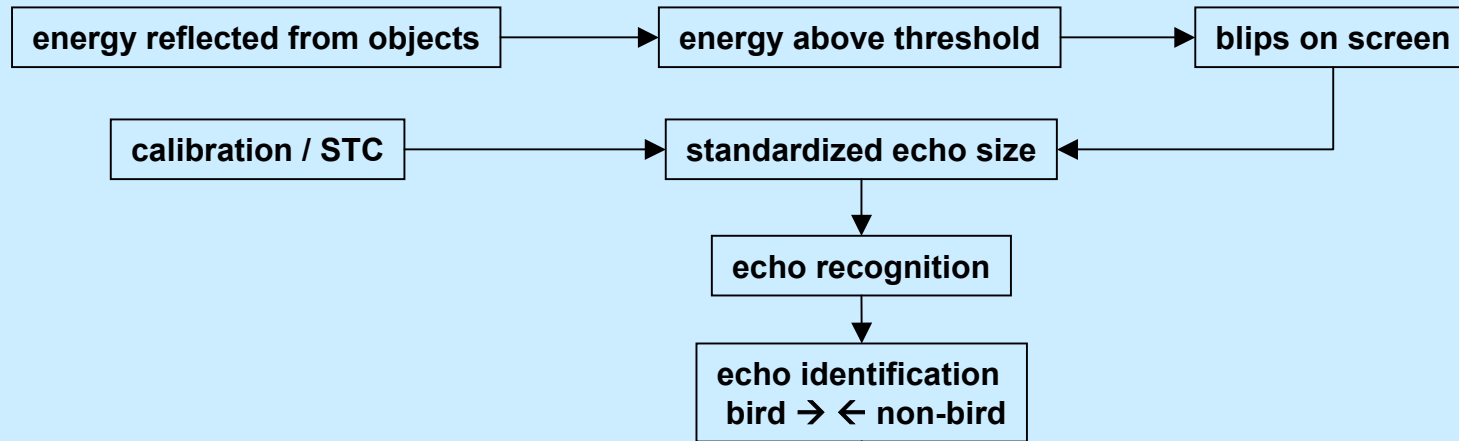
$$d = ((\cos(\alpha) \cdot \sin(\phi) \cdot d_0)^2 + h_i^2)^{0.5}$$



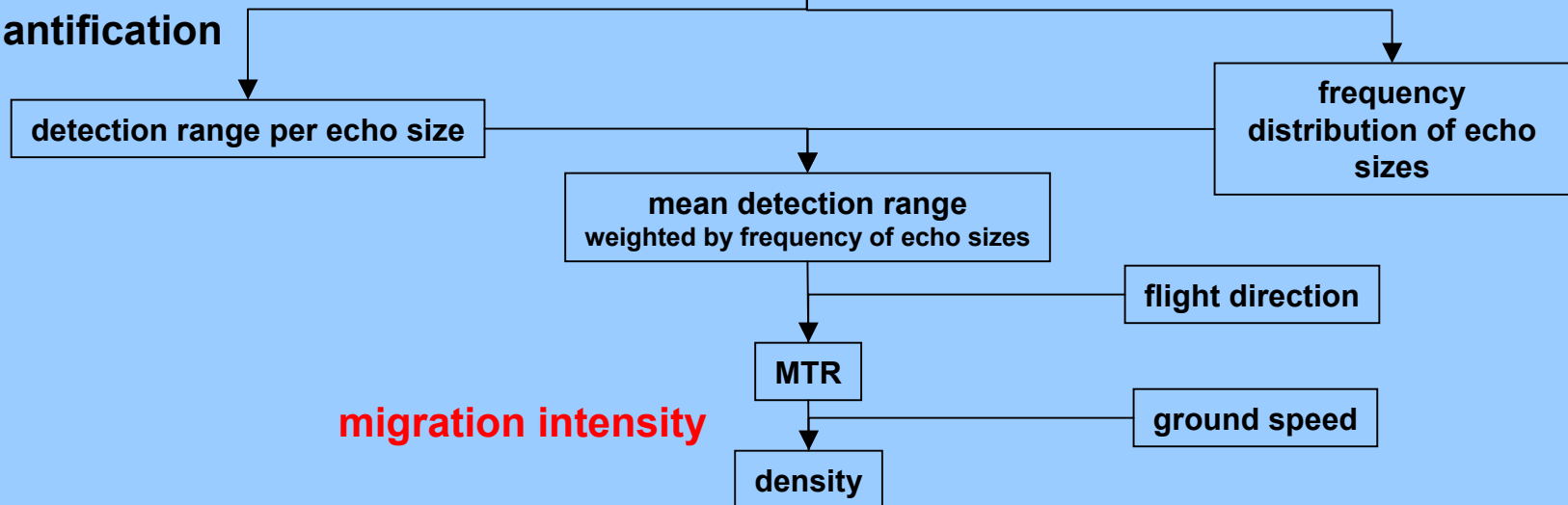


From blibs to bird quantification

echo detection



quantification



migration intensity



The main pitfalls

level	crucial points		consequences if not considered:	effect on results
detecti on	calibration of echo intensity and STC-effect		unknown influence of echo size composition	absolute and relative figures unreliable
identifi cation	bird → ← insect identification		unknown proportion of birds	absolute and relative figures unreliable; deviation from real bird density depends on season and geographical region
quantifi cation	detection range	mean detection range: weighted by frequency of echo sizes	surveyed space too large or small	absolute figure is wrong; relative comparison possible, if echo sizes are uniformly distributed
		aspect	surveyed space too large	absolute figure is wrong; altitude distribution biased
		detection ranges for bird classes	variability in the composition of bird migration ignored.	absolute and relative figure biased due to variation in species composition.
	migration traffic rate	flight direction	surveyed range overestimated	absolute and relative figure biased according to the amount of variability in flight directions between nights
	density	ground speed	inaccurate transformation from MTR to density	absolute figure is wrong; mistake depends on variation of ground speed (mainly wind conditions) [FL1]



What you get from which radar mode

radar measurement	echo signature	echo size	air speed	flight direction	distance to radar	representative sample
fixed beam*	yes	(yes)	no	no	yes	yes
horizontal scanning	no	(yes)	yes	yes	yes	yes
vertical scanning	no	yes	no	no	yes	yes
conical scanning	no	no	no	no	yes	yes
tracking*	yes	yes	yes	yes	yes	no



From blibs to bird quantification



From blibs to bird quantification



Discriminating birds from insects

