CHOICES FOR A PRIORI LAKE DATASET

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LAKE *A PRIORI* DATABASE: WHAT FOR?

→ **Monitor temporal evolution of lakes**

- *water storage, rating curves, ...*

Use for product diffusion:

- Search by name, river basin

Use in processing steps:

- Pass-based products:
  - Link observed water bodies to referenced lakes (intersection of polygons)
  - All new objects recorded in lake products; no update of the lake database on the flow
- Cycle-based products:
  - Produced only for lakes in database
  - Compute water storage from reference
- 4 versions:
  - Before-launch: need to have as many lakes as possible, « better more than less » *(i.e. over-estimation is not an issue)*
  - T0+15m and T0+24m, before a L2 products reprocessing
    - To add persistent new objects
    - To record max level/size of lakes
  - At the end of the mission, before the global reprocessing
  - Updating process with SWOT data needs to be defined

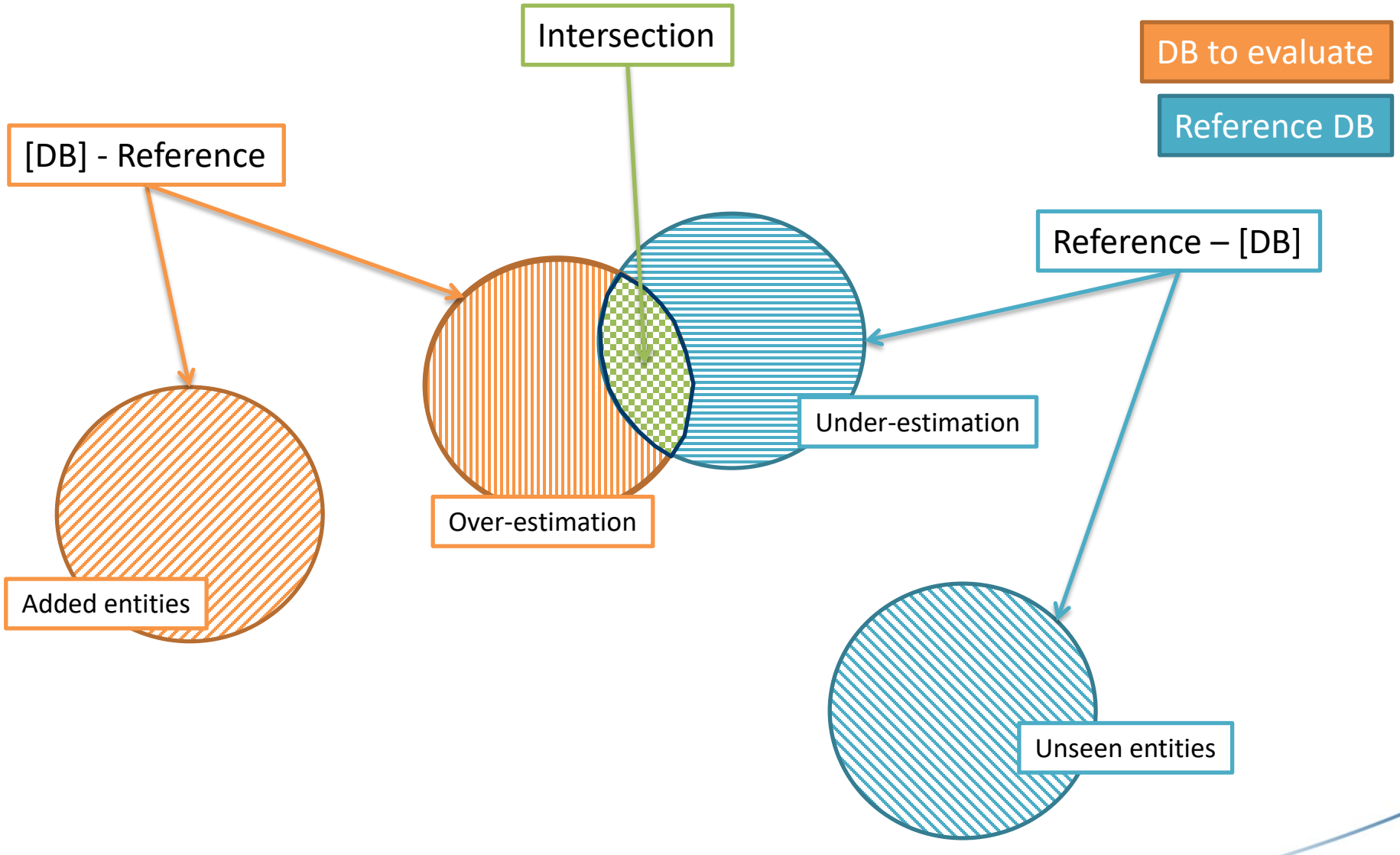
WHICH ONE(S) TO CHOOSE? ~ FIRST ANALYSIS

Input = Yésou et al. referencing and comparison of water databases

First selection:

- Criteria =
  - Surface area: **goal (> 1ha)** – **requirement (>6.25ha)** – larger than requirement
  - Format: **shapefile** – raster
  - Coverage: **global** – **continental** – country
  - Lakes vs rivers distinction: **yes** – no
  - Availability: **direct** – **contact** – charge
- Selection:
  - Open Street Map (OSM)
  - SRTM Water Body Data (SWBD)
  - CIRCA 2000 high-resolution systematically-generated global lake GIS database [Sheng et al.]

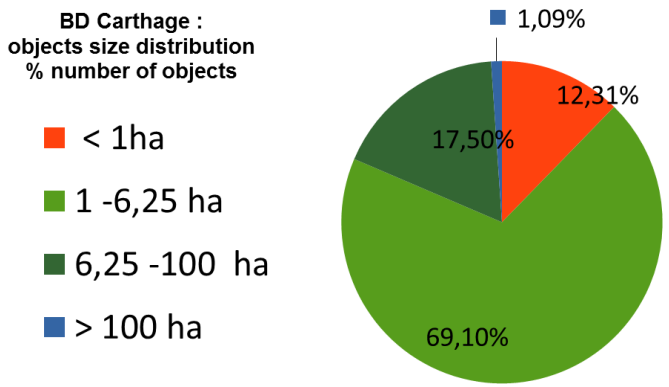
COMPARISON METHOD

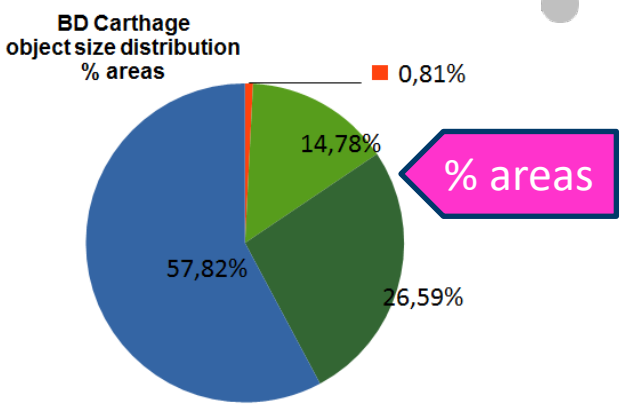


WATER BODIES SIZE DISTRIBUTION

BD Carthage

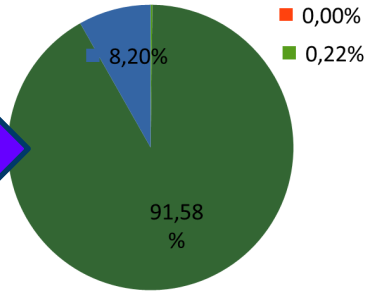
% number of objects



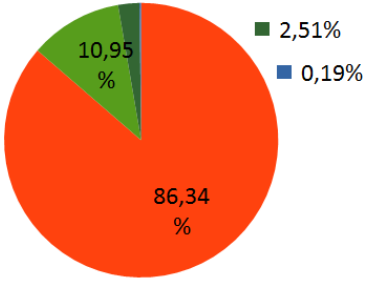


% areas

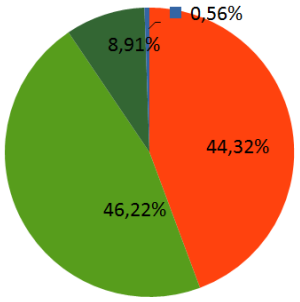
SWBD



OSM

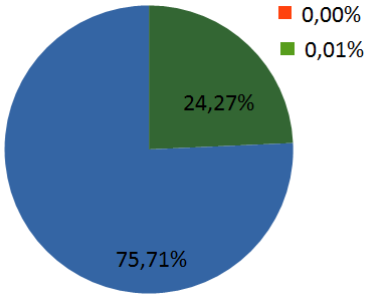


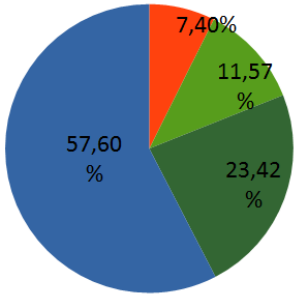
Sheng

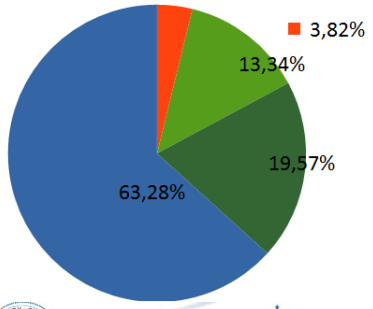


% number of objects

% areas







ON-GOING WORK

Very preliminary results:

- Comparison has to be taken with care:
- Need to be consolidated worldwide

Next step = consider raster databases (ex: Pekel):

- 1°) Remove rivers (using the river *a priori* database)
- 2°) Convert to polygon shapefiles

Planning:

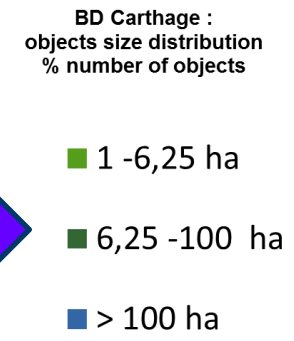
- End of this year: have a first version of the database with the correct format (for processing tests)
- Next year: consolidate the content
  - ✦ Why not combine the best of global and regional databases?

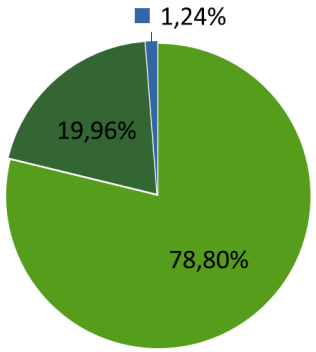
BACKUP

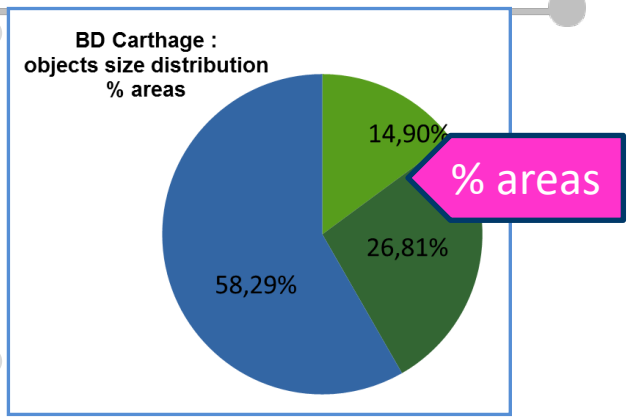
WATER BODIES SIZE DISTRIBUTION
> GOAL SWOT

BD Carthage

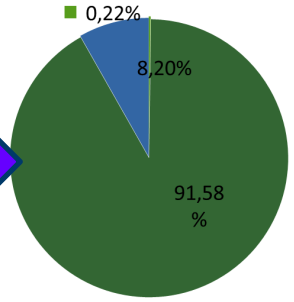
% number of objects



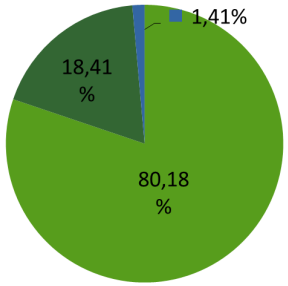




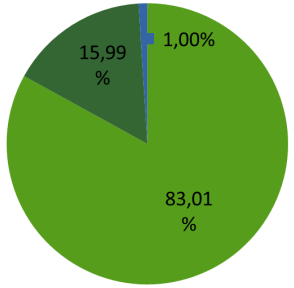
SWBD



OSM

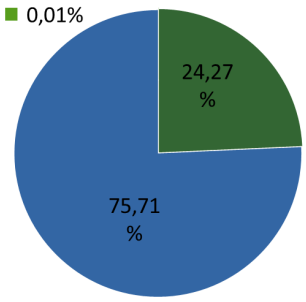


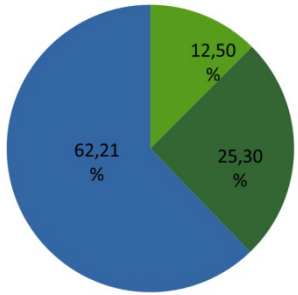
Sheng

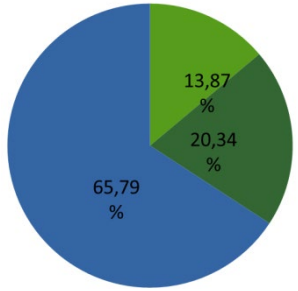


% number of objects

% areas







COMPARISONS VERSUS CARTHAGE
~ REQUIREMENT AREAS ~

Carthage DB (Area > SWOT requirement) = 393 688 ha

[DB]	SWBD = 254 900 ha	OSM = 484 724 ha	Sheng = 210 865 ha
Intersection	233 185 ha *= 59% Carthage*	326 006 ha *= 82% Carthage*	203 053 ha *= 52% Carthage*
[DB] – reference	21 694 ha *= 9% SWBD*	161 697 ha *= 33% OSM*	7 664 ha *= 4% Sheng*
Over-estimation	12 350 ha *= 57% [DB-Ref]*	63 625 ha *= 39% [DB-Ref]*	3 952 ha *= 52% [DB-Ref]*
Added entities	9 350 ha *= 43% [DB-Ref]*	98 070 ha *= 61% [DB-Ref]*	3 712 ha *= 48% [DB-Ref]*
Reference – [DB]	160 500 ha *= 41% Carthage*	70 442 ha *= 18% Carthage*	190 637 ha *= 48% Carthage*
Under-estimation	64 000 ha *= 40% [Ref-DB]*	36 265 ha *= 51% [Ref-DB]*	55 761 ha *= 29% [Ref-DB]*
Unseen entities	96 500 ha *= 60% [Ref-DB]*	34 277 ha *= 49% [Ref-DB]*	134 876 ha *= 71% [Ref-DB]*

25% Carthage

9% Carthage

34% Carthage

COMPARISONS VERSUS CARTHAGE
~ GOAL AREAS ~

Carthage DB (Area > SWOT goal) = 462 629 ha

[DB]	SWBD	OSM = 553 045 ha	Sheng = 244 821 ha
Intersection		368 744 ha *= 80% Carthage*	229 418 ha *= 50% Carthage*
[DB] – reference		184 153 ha *= 33% OSM*	15 177 ha *= 6% Sheng*
Over-estimation		94 491 ha *= 51% [DB-Ref]*	5 798 ha *= 38% [DB-Ref]*
Added entities		89 662 ha *= 49% [DB-Ref]*	9 379 ha *= 62% [DB-Ref]*
Reference – [DB]		93 879 ha *= 20% Carthage*	233 220 ha *= 50% Carthage*
Under-estimation		48 213 ha *= 51% [Ref-DB]*	97 498 ha *= 42% [Ref-DB]*
Unseen entities		45 666 ha *= 49% [Ref-DB]*	135 722 ha *= 58% [Ref-DB]*

10% Carthage

29% Carthage