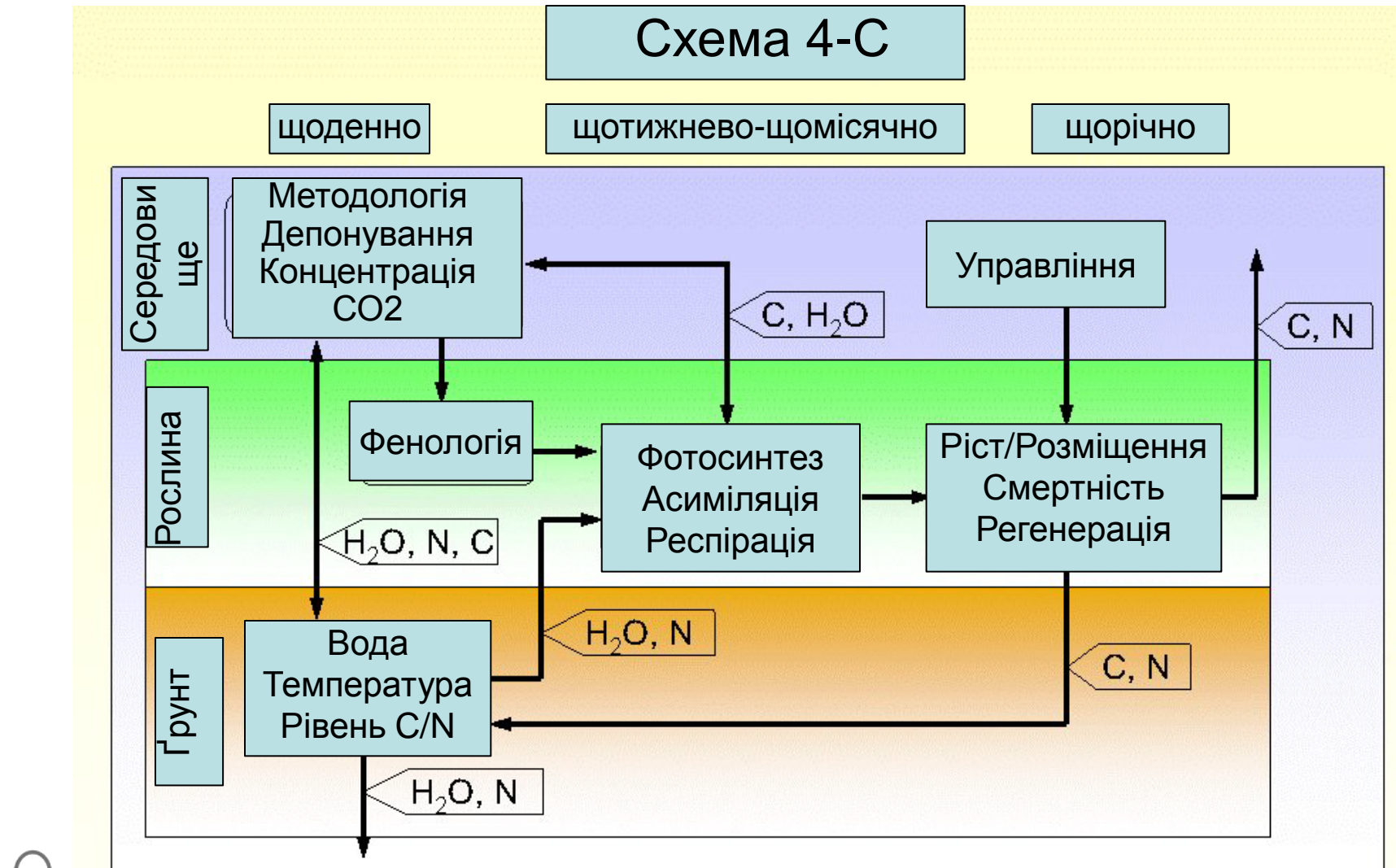
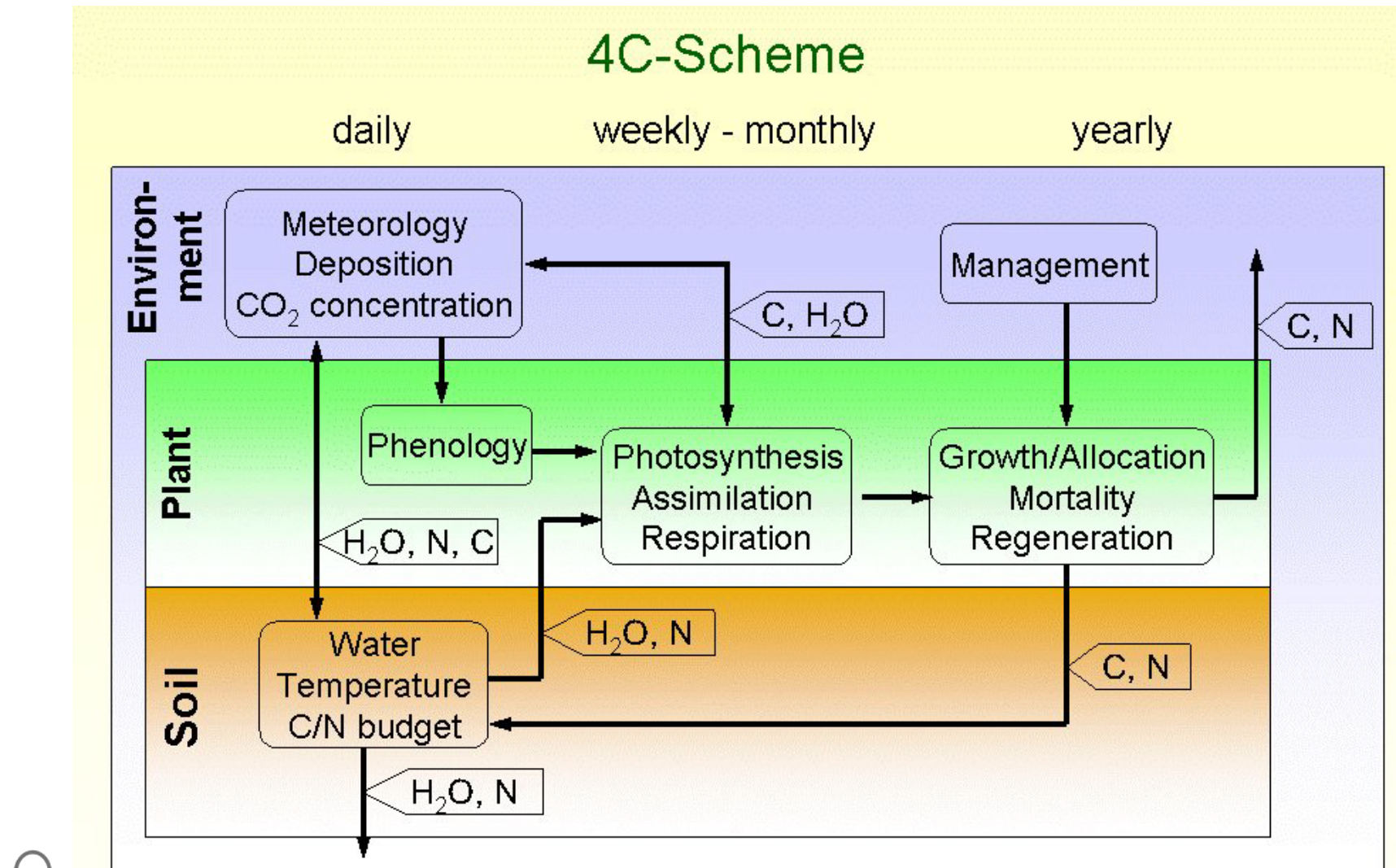


Stand-scale models – PROFOUND/ISIMIP overview

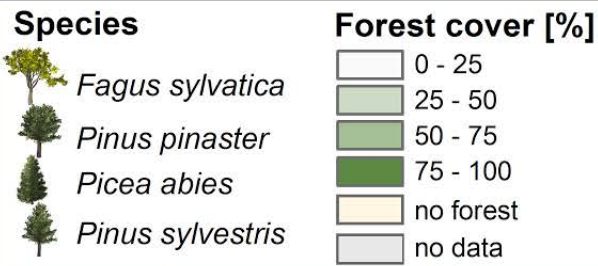
Процесно-орієнтована модель росту лісу 4C (FORESEE – екосистеми лісу в змінному середовищі)



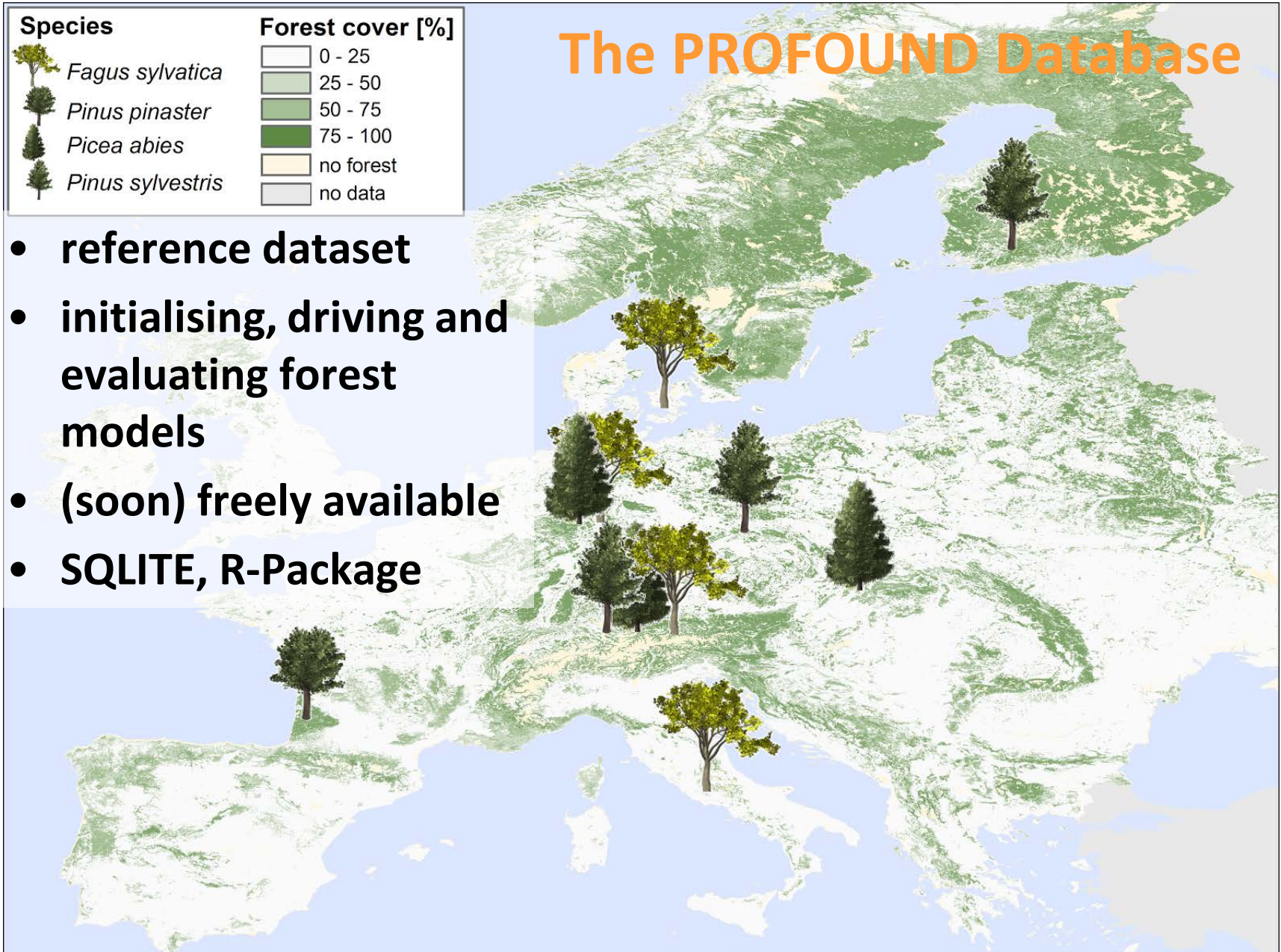
Процесно-орієнтована модель росту лісу 4C (FORESEE – екосистеми лісу в змінному середовищі)



The PROFOUND Database



- reference dataset
- initialising, driving and evaluating forest models
- (soon) freely available
- SQLITE, R-Package



Data availability

	Bily Kriz	Collelongo	Hyytiälä	KROOF	Le Bray	Peitz	Solling	Sorø
Soil	2011 ^o	1995/2008 ^o	1995/1996 ^o	2000-2014 ^o	1995/2003/2004/ 2005 ^o	2011 ^o	2010 ^o	1997/2004/2006 ^o
Local climate	2000-2008 ^D	1996-2014 ^D	1996-2014 ^D	1998- 2010 ^D	1996-2008 ^D	1901-2010 ^D	1960-2013 ^D	1996-2012 ^D
Reanalysis climate	1901-2012 ^D	1901-2012 ^D	1901-2012 ^D	1901-2012 ^D	1901-2012 ^D	1901-2012 ^D	1901-2012 ^D	1901-2012 ^D
Climate Scenarios (ISIMIP2b)	1661-2299 ^D	1661-2299 ^D	1661-2299 ^D	1661-2299 ^D	1661-2299 ^D	1661-2299 ^D	1661-2299 ^D	1661-2299 ^D
Climate Scenarios (ISIMIPFT)	1950-2099 ^D	1950-2099 ^D	1950-2099 ^D	1950-2099 ^D	1950-2099 ^D	1950-2099 ^D	1950-2099 ^D	1950-2099 ^D
Atmospheric CO ₂	1765-2500 ^A	1765-2500 ^A	1765-2500 ^A	1765-2500 ^A	1765-2500 ^A	1765-2500 ^A	1765-2500 ^A	1765-2500 ^A
Nitrogen Deposition (ISIMIP2b)	1861-2100 ^A	1861-2100 ^A	1861-2100 ^A	1861-2100 ^A	1861-2100 ^A	1861-2100 ^A	1861-2100 ^A	1861-2100 ^A
Nitrogen Deposition (EMEP)	1980-2014 ^A	1980-2014 ^A	1980-2014 ^A	1980-2014 ^A	1980-2014 ^A	1980-2014 ^A	1980-2014 ^A	1980-2014 ^A
Forest tree data	1997-2015 ^A	1992-2012 ^A	2001-2005 ^A	1997-2010 ^A	-	1948-2011 ^A	1967-2014 ^A	1944-2010 ^A
Forest stand data	1997-2015 ^A	1992-2012 ^A	1995-2011 ^A	1997-2010 ^A	1986-2009 ^A	1937-2011 ^A	1967-2014 ^A	1944-2013 ^A
Modis	2000-2014 ^C	2000-2014 ^C	2000-2014 ^C	2000-2014 ^C	2000-2014 ^C	2000-2014 ^C	2000-2014 ^C	2000-2014 ^C
Flux	2000-2008 ^M	1996-2014 ^M	1996-2014 ^M	-	1996-2008 ^M	-	-	1996-2012 ^M
Meteorological	2000-2008 ^M	1996-2014 ^M	1996-2014 ^M	-	1996-2008 ^M	-	-	1996-2012 ^M
Energy Balance	2000-2008 ^M	1996-2014 ^M	1996-2014 ^M	-	1996-2008 ^M	-	-	1996-2012 ^M
Soil time series	2000-2008 ^M	1996-2014 ^M	1996-2014 ^M	-	1996-2008 ^M	-	-	1996-2012 ^M

Soil

Climate

CO₂ & Nitrogen

Tree & Stand

Remote Sensing

Fluxes

PROFOUND/ISIMIP simulation protocol

Set of runs	Simulation time	Climate Data*	CO ₂ Data*	N-Deposition Data*	Stand/Soil Data*	Management**	# runs/site	Comments
LOCAL	ini-endofclimate	CLIMATE_LOCA L	CO2-ISIMIP (historical data until 2015)	NDEPOSITION _EMEP	TREE, STAND, SOIL	observed and natural reference	2	For detailed, local model evaluation
ISIMIP2BLBC	ini-2100/2300	CLIMATE_ISIMI P2BLBC	CO2-ISIMIP (historical data until 2005, then switch to RCP)	NDEPOSITION _ISIMIP2B	TREE, STAND, SOIL	observed+generic future and natural reference	30	Locally bias-corrected climate data, includes fixed CO2 and picontrol experiments
ISIMIP2B	ini-2100/2300	CLIMATE_ISIMI P2B	CO2-ISIMIP (historical data until 2005, then switch to RCP)	NDEPOSITION _ISIMIP2B	TREE, STAND, SOIL	observed+generic future and natural reference	30	Original ISIMIP2B data, includes fixed CO2 and picontrol experiments
ISIMIP2A	ini-endofclimate	CLIMATE_ISIMI P2A	CO2-ISIMIP (historical data until 2015)	NDEPOSITION _EMEP	TREE, STAND, SOIL	observed and natural reference	8	Original ISIMIP2A data
ISIMIPFT	ini/1950-21002	CLIMATE_ISIMI PFT	(historical data until 2005, then switch to RCP)	N.A.	TREE, STAND, SOIL	observed+generic future and natural reference	80	Original ISIMIPFT data, includes fixed CO2 experiment

- **Experiments: with/without management, with/without increasing CO₂, with preindustrial, historical & future climate**
- **26 + 14 optional variables (stand dynamics, carbon stocks and fluxes, water cycles) → per species, dbh_class**



Management

Name	Ini	HM	FM1	FM2	FM3	FM4	FM5	FM6	FM7	FM8	FMX	FMX	FMX	FMX	FMX
bily_kriz	1997	1998-2015 ^I	2030 ^I	2045 ^I	2060 ^I	2075 ^I	2090 ^I	2101 ^H	2102 ^P	2117 ^I	...	2222 ^H	2223 ^P	2238 ^I	...
collelongo	1992	1997-2012 ^I	2027 ^I	2032 ^H	2033 ^P	2048 ^I	2063 ^I	2078 ^I	2093 ^I	...	2173 ^H	2174 ^P	2189 ^I
hyytiala*	1995	1996-2011 ^I	2026 ^I	2041 ^I	2056 ^I	2071 ^I	2086 ^I	2101 ^H	2102 ^P	2117 ^I	...	2242 ^H	2243 ^P	2258 ^I	...
kroof*	1997	1999-2010 ^I	2025 ^I	2040 ^I	2055 ^I	2070 ^I	2085 ^I	2100 ^I	2101 ^H	2102 ^P	2117 ^I	...	2222 ^H	2223 ^P	...
le_bray	1986	1987-2009 ^I	2015 ^H	2016 ^P	2026 ^I	2036 ^I	2046 ^I	2056 ^I	2061 ^H	2062 ^P	2072 ^I	...	2107 ^H	2108 ^P	2118 ^I
Peitz	1948**	1952-2011 ^I	2026 ^I	2040 ^H	2041 ^P	2056 ^I	2071 ^I	2086 ^I	2101 ^I	...	2181 ^H	2182 ^P	2197 ^I
solling_beech*	1967	1968-2014 ^I	2015 ^H	2016 ^P	2031 ^I	2046 ^I	2061 ^I	2076 ^I	2091 ^I	...	2156 ^H	2157 ^P	2172 ^I	...	2297 ^H
solling_spruce*	1967	1968-2014 ^I	2024 ^H	2025 ^P	2040 ^I	2055 ^I	2070 ^I	2085 ^I	2100 ^I	...	2145 ^H	2146 ^P	2161 ^I	...	2266 ^H
Soro	1944**	1945-2005 ^I	2020 ^I	2035 ^I	2050 ^I	2061 ^H	2062 ^P	2077 ^I	2092 ^I	...	2202 ^H	2203 ^P	2218 ^I

- Observed past and generic future management guidelines
- Planting information

Stand models in FORMASAM

	Species mixture	Uneven-aged	Thinning	final cut	In-growth	Pruning	Thinning method
SIBYLA	x	x	x	x	x		distance-dependent
SAMSARA		x	x	x	x		distance-dependent
BALANCE	x		x	x			individual
4C	x		x	x			individual
FORMIND	x		x	x	x		individual
GOTILWA+			x	x	x		individual
FORCLIM	x	x	x	x	x		individual
PREBAS	x		x	x			species / size class
3D-CMCC-CNR	x	x	x	x			species
BASFOR			x	x		x	stand

Management methods

- **All models:**
 - **Timing and intensity of harvests in even-aged stands**
- **Some models**
 - **Natural regeneration**
 - **Mixed stands**
 - **Uneven-aged stands**
 - **Pruning**
 - **Species change to more exotic / unusual species**

Management impacts

- All models project impacts at stand level on
 - Growth
 - Carbon balance of tree crop
- Individual-based models project impacts on
 - Size distributions
 - Species competition
- Few models project impacts on
 - Natural emergence of new species