Mode	Species
NS	NUM,SO4+WAT
KS	NUM,SO4,BC,OC+WAT
AS	NUM,SO4,BC,OC,SS,DU+WAT
CS	NUM,SO4,BC,OC,SS,DU+WAT
KI	NUM,BC,OC
AI	NUM,DU
CI	NUM,DU
CD (virtual mode)	SO4,BC,OC,SS,DU
IC (virtual mode)	SO4,BC,OC,SS,DU

ECHAM5

Module	Variable	Description
mo_aero_species	idt_cd, idt_ic	tracer index of in-droplet/in_crystal species
	id_so4,id_bc,id_oc,id_ss,id_du	tracer index of aerosol species
	naerospec	number of aerosol species (includes water)
	aerospec	properties of species
	itrac2aerospec	index of aerosol/in-cloud species
mo_aero_m7	m7mode	some properties of each mode
	naeromod	number of all aerosol species in all modes (excludes water)
	nmod	number of modes
	nsol	number of soluble modes
	inucs	index of nucleation mode soluble
	iaits	index of aitken mode soluble
	iaccs	index of accumulation mode soluble
	icoas	index of coarse mode soluble
	iaiti	index of aitken mode insoluble
	iacci	index of accumulation mode insoluble
	icoai	index of coarse mode insoluble
	iso4ns, iso4ks, iso4as, iso4cs	SO4 tracer indices for all modes
	ibcks, ibcas, ibccs, ibcki	BC tracer indices for all modes
	iocks, iocas, ioccs, iocki	OC tracer indices for all modes
	issas, isscs	SS tracer indices for all modes
	iduas, iducs, iduai, iduci	DU tracer indices for all modes
mo_aeromode	aeromode	properties of species in mode: species,mode,tracer index
	aerowater	properties of water mass in mode:species,mode
	im7table	for quick translation between mode, species id and aeromode index
mo_tracer	ntrac	number of tracers
	trlist	tracer info list variable
	AEROSOLMASS, AEROSOLNUMBER	phase indicator
	IN_CLOUD_LIQUID, IN_CLOUD_ICE	phase indicator
mo_aero_trac	idt_cdnc	tracer index of cloud droplet number concentration
	idt_icnc	tracer index of ice crystal number concentration

Example loop 1:

```
DO jn=1,naermod
    jspec = aeromode(jn)%species%self        index of aerosol species
    jmod = aeromode(jn)%mode%self            index of aerosol mode
    jtaer = aeromode(jn)%idt                 tracer index of aerosol mass
    jtcl = idt_cd(jspec)                     tracer index of in-droplet species
    jtic = idt_ic(jspec)                     tracer index of in-crystal species
    jtnum = m7mode(jmod)%idt_no              tracer index of aerosol number
END DO
```

Example loop 2:

```
DO jn=1,naerospec
    IF (jn==id_wat) CYCLE                    naerospec includes water
    jtcl = idt_cd(jn)                        tracer index of in-droplet species
    jtic = idt_ic(jn)                        tracer index of in-crystal species
    jdens=aerospec(jn)%density               density of species
END DO
```

Example loop 3:

```
DO jn=1,nmod
    jtnum = m7mode(jn)%idt_no                tracer index of aerosol number
    aerowater(jn)%idt                        tracer index of water mass in mode

    lsol = m7mode(jn)%lsoluble               .TRUE. for soluble modes
END DO
```

Example loop 4:

DO jt=1,jtrac

jspec = itrac2aerospec(jt)	index of aerosol/in-cloud species
jmod = trlist%ti(jt)%mode	index of aerosol mode
laeromass=(trlist%ti(jt)%nphase==AEROSOLMASS	.TRUE. for tracer of aerosol mass
laeronum=(trlist%ti(jt)%nphase==AEROSOLNUMBER	.TRUE. for tracer of aerosol number
lincd = trlist%ti(jt)%nphase == IN_CLOUD_LIQUID	.TRUE. for tracer of in-droplet species
linic = trlist%ti(jt)%nphase == IN_CLOUD_ICE	.TRUE. for tracer of in-crystal species

END DO

Further Example:

jtaer = aeromode(im7table(jmode, jspec))%idt tracer index of aerosol mass

with jmode=inucs,iaits,iaccs,icoas,iaiti,iacci,icoai and jspec=id_so4,id_bc,id_oc,id_ss,id_du

ECHAM6

Module	Variable	Description
mo_ham_species	idt_cd, idt_ic	tracer index of in-droplet/in_crystal species
	id_so4,id_bc,id_oc,id_ss,id_du	tracer index of aerosol species
mo_species	naerospec	number of aerosol species (includes water)
	aero_idx	"aero"-index of species
	speclist	properties of species/mode, species id and aerocomp id
mo_ham	m7mode	some properties of each mode
	naerocomp	number of all aerosol species in all modes (excludes water)
	aerocomp	properties of species in mode: species,mode,tracer index
	aerowater	properties of water mass in mode:species,mode
mo_ham_m7ctl	nmod	number of modes
	nsol	number of soluble modes
	inucs	index of nucleation mode soluble
	iaits	index of aitken mode soluble
	iaccs	index of accumulation mode soluble
	icoas	index of coarse mode soluble
	iaiti	index of aitken mode insoluble
	iacci	index of accumulation mode insoluble
	icoai	index of coarse mode insoluble
	iso4ns, iso4ks, iso4as, iso4cs	SO4 tracer indices for all modes
	ibcks, ibcas, ibccs, ibcki	BC tracer indices for all modes
	iocks, iocas, ioccs, iocki	OC tracer indices for all modes
	issas, isscs	SS tracer indices for all modes

	iduas, iducs, iduai, iduci	DU tracer indices for all modes
mo_tracdef	ntrac	number of tracers
	trlist	tracer info list variable
	AEROSOLMASS, AEROSOLNUMBER	phase indicator
	IN_CLOUD_LIQUID, IN_CLOUD_ICE	phase indicator
mo_activ	idt_cdnc	tracer index of cloud droplet number concentration
	idt_icnc	tracer index of ice crystal number concentration

Example loop 1:

```
DO jn=1,naerocomp
    jspec = aerocomp(jn)%spid          index of aerosol species
    jmod = aerocomp(jn)%iclass         index of aerosol mode
    jtaer = aerocomp(jn)%idt           tracer index of aerosol mass
    jtcl = idt_cd(jspec)               tracer index of in-droplet species
    jtic = idt_ic(jspec)               tracer index of in-crystal species
    jtnum = m7mode(jmod)%idt_no        tracer index of aerosol number
END DO
```

Example loop 2:

```
DO jn=aero_idx(1),aero_idx(naerospec)
    IF (jn==id_wat) CYCLE              naerospec includes water
    jtcl = idt_cd(jn)                  tracer index of in-droplet species
    jtic = idt_ic(jn)                  tracer index of in-crystal species
    jdens=speclist(jn)%density         density of species
END DO
```

Example loop 3:

```
DO jn=1,nmod
    jtnum = m7mode(jn)%idt_no          tracer index of aerosol number
    aerowater(jn)%idt                  tracer index of water mass in mode

    lsol = m7mode(jn)%lsoluble         .TRUE. for soluble modes
END DO
```

Example loop 4:

```
DO jt=1,jtrac
        jspec = trlist%ti(jt)%spid                              index of aerosol/in-cloud species
        jmod = trlist%ti(jt)%mode                               index of aerosol mode
        laeromass=(trlist%ti(jt)%nphase==AEROSOLMASS            .TRUE. for tracer of aerosol mass
        laeronum=(trlist%ti(jt)%nphase==AEROSOLNUMBER           .TRUE. for tracer of aerosol number
        lincd = trlist%ti(jt)%nphase == IN_CLOUD_LIQUID         .TRUE. for tracer of in-droplet species
        linic = trlist%ti(jt)%nphase == IN_CLOUD_ICE            .TRUE. for tracer of in-crystal species
END DO
```

Further Examples:

```
jtaer = aerocomp(speclist(jspec)%iaerocomp(jmode))%idt      tracer index of aerosol mass
```

with jmode=inucs,iaits,iaccs,icoas,iaiti,iacci,icoai and jspec=id_so4,id_bc,id_oc,id_ss,id_du

```
DO jt=1,ntrac
        DO jl=1,kproma
                DO jk=1,klev
                        pxtp1(jl,jk,jt)=pxtm1(jl,jk,jt)+pxtte(jl,jk,jt)*time_step_len
                END DO
        END DO
END DO
```

pxtp1	tracer at t+1	
pxtm1	tracer at t-1	
pxtte	tracer tendency	
time_step_len	length of timestep	(mo_time_control)